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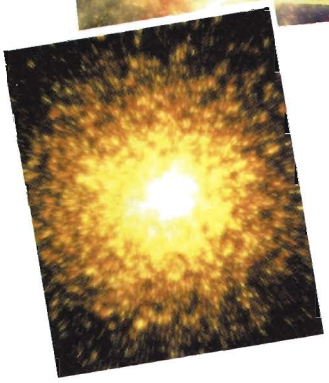

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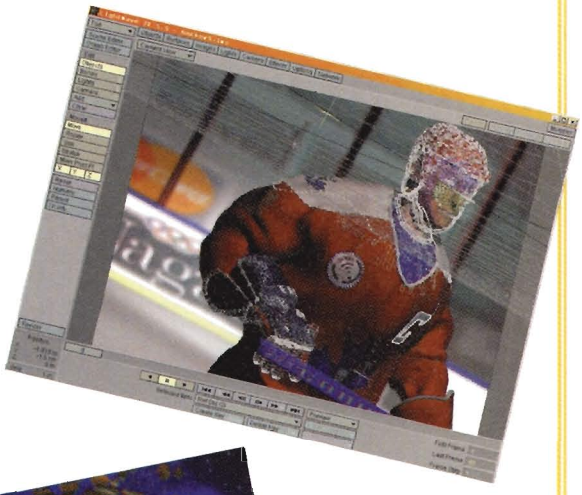

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ON THE COVER:

This issue's cover was created by Area 51's Scott Wheeler for the show "Confirmation," airing in February on NBC. The show will take an in-depth look at some of the most famous UFO encounters. The cover image is also the topic of this year's LightWave 301 column (page 18).

TekTALK

OUR EDITOR'S OPINIONS ON IMPORTANT NEWTEK ISSUES

BY JOE TRACY

It took a unique solution, inspired by *Pleasantville*, to keep readers number one.

Finding Solutions: PUTTING CUSTOMERS FIRST

If you run your own animation or video production business, there is one lesson you should never forget: "Always put your customer first and if there's a problem, find a solution." As a strong believer in customer relations, I was recently faced with creating a unique solution for readers of *NewTekniques*. The problem was a need for more Amiga, Video Toaster, and Video Toaster Flyer coverage without affecting the amount of LightWave 3D coverage and without increasing the expense of the magazine.

Quarterly Review

When I get an email from a reader with a suggestion, concern, or praise, that email goes into a special folder that I review in detail every quarter. At the end of the third quarter, 1998, I saw a number of requests for more Amiga, Video Toaster, and Video Toaster Flyer information to appear in print versus online. I also saw requests from LightWave 3D users for more tutorials in print. Now solving both of these requests isn't easy. The magazine has a budget it needs to adhere to for each issue, so increasing the page count didn't appear to be an option.

Pleasantville

Feeling backed into a corner, I continued to pursue ideas to increase coverage in print for both LightWave 3D users and Amiga/Toaster/Flyer users, and still stay within my strict budget. Hours turned into days and days turned into weeks. Ending my quest without a solution was unacceptable. When it comes to customer service, it is important to do everything in your power to make sure that 100% of your customer base is more than satisfied with your work, efforts, and the finished result. It wasn't until late October that the first sign of a solution hit, and it came in the form of a movie! In late October, *Pleasantville* hit theaters with its unique mixture of black and white with color. There was the solution!

It's All in Black and White

I worked out a plan to add 16 black and white pages to *NewTekniques* magazine, dedicated 100% to Amiga, Toaster, and Flyer users without affecting the color LightWave 3D section. Furthermore, this solution cleared up more space for LightWave 3D users because the Flying High column was moved into the new black and white section. As an extra addition, we bypassed the feature in this issue in favor of another LightWave 3D tutorial.

"The Gateway"

Beginning with this issue, *NewTekniques* is proud to introduce "The Gateway." This regularly appearing section even has its own editor—Dhomas Trenn! Trenn joins the *NewTekniques* team from *CU Amiga* magazine and *The Amiga Informer* where he served as a regular columnist. He brings with him a group of talented people that will open up a gateway for Amiga, Toaster, and Flyer users through this new print section and a dedicated online bonus section. I live by the philosophy that if you make customers number one, they will make you number one. There's no doubt in my mind that it's true.

Joe Tracy

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Plugged In

LIGHTWAVE ADVANCEMENTS THROUGH PLUG-IN SCRIPT WRITING

The Hole Punch Transparency Effect

PLUG-IN MAGIC

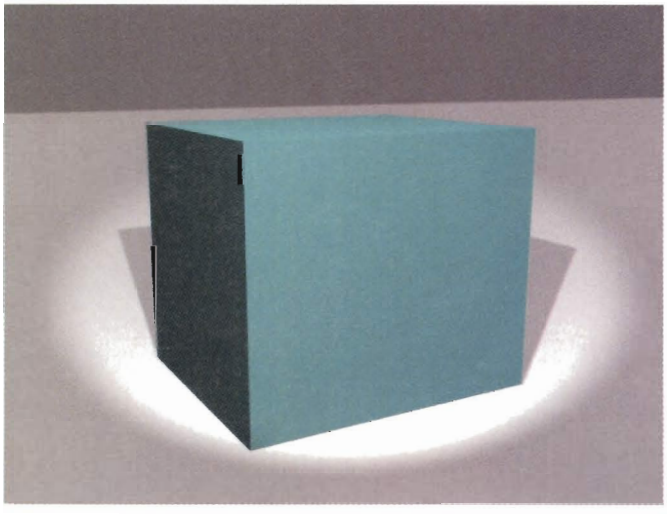
The power of two plug-ins, Item Motion and Procedural Texture, are combined into one.

BY BOB HOOD

A good friend of mine, a wizard with LightWave 3D, is also a professional magician. This particular aspect of his life was unknown to me for the longest time. When the day came that he actually demonstrated this talent to me personally, he surprised me to new levels of admiration. It is one thing to see it performed on television; it's quite another to have it performed right in front of you by a real professional! It was a moment I will always remember.

This month, we'll create our own particular kind of magic with LightWave by combining the power of two plug-in architectures, Item Motion and Procedural Texture, to create a "hole punch" transparency effect on selected surfaces. This effect is illustrated between Figures 1 and 2.

Figure 1. A cube with a sphere inside.



Can We Talk?

The LightWave plug-in API keeps its various architectures highly segregated, making access to the indigenous data of one plug-in type difficult for a plug-in of another type. However, interesting and useful effects can be achieved when the data as a whole is allowed to "interact."

Although raw facilities are now available, the lower-level plug-in API provides no structured methods for sharing data amongst plug-ins. Because LScript does, we will be employing this particular feature of the scripting software, known as the Inter-Plugin Communication (IPC) mechanism, or simply the "Queue"-in order to share data between scripts of two different architectures.

On a technical note, LScript's IPC mechanism differs from that available in the plug-in API in that it utilizes operating system-specific data exchange facilities. This makes it possible for LightWave LScripts to exchange data with non-LightWave processes.

Magic In Motion

First, we will create an "effector" using the Item Motion plug-in architecture. Our effector will have only one instance in the animation, and for the sake of simplicity and speed, will be perfect-

ly spherical (the reason for this will be explained later).

Lines 4-8 of the LS/IA script in Listing 1 create an IPC Queue that the effector will use to make its values available on a frame-by-frame basis. Because the effector object will not directly interact with any other object, all we need do is "broadcast" all of the relevant information regarding the effector, and anyone interested can "listen in."

The effector is really just a collection of values that will be used by other plug-ins in calculations on their data. Because of this, there is no real need to have actual mesh in Layout to represent the effector. A Null object will suffice. Because we humans are highly visual animals, I typically use an actual spherical mesh to represent the effector. Of course, because it is simply a reference in setting up the animation, I turn the dissolve on the effector object up to 100% so that it will not render. Figure 3 shows the effector object (rendered as an outline) and how it relates to the "hole punch" effect created.

Anatomy Of An Effector

As mentioned, lines 4-8 of Listing 1 create an IPC Queue to hold the calculated effector values.

Lines 10-12 establish some global variables that the script will maintain to allow the user a greater degree of control over the effect (these values can be altered in the options() function). The scaleEffect Boolean value will let us know whether to adjust the radius of the effect based on the scale of the Layout effector object. When calculating the actual range of the effect, fullEffectRadius is the basis of that range, measured in meters. I say "basis" because the scaleEffect setting may actually cause the script to alter it.

The transparency effect generated will leave a "hard" edge. So we will use the falloffEffectRadius value to allow the user to create an area where the transparency will interpolate from 100% at the fullEffectRadius to 0% at the falloffEffectRadius. Figure 4 shows this transparency effect with settings of 50 centimeters for the fullEffectRadius, and 100 centimeters for the falloffEffectRadius, giving a falloff range of 50 centimeters.

Lines 14-26 contain the script's create() function. We set the description of the script on line 16, and initialize our global variables in this function. Notice on lines 23-25 we set three values that appear to be local to create(). In reality, these three values belong to the IPC Queue we created earlier, and are treated as global variables. LScript knows that these variables actually belong to a Queue, and are not local to the function. We have effectively set Queue values without using any special syntax.

Lines 28-39 contain the frame-by-frame processing code for our effector. The first action we'll take is to get our effector object's world coordinates by calling an Object Agent method get() using the WPOSITION selector. (A discussion of LScript Object Agents will be in an upcoming installment, so for now I will simply say that both internal and external Object Agents are an object-oriented extension mechanism that encapsulates various types of data. Like their C++ counterparts, they provide access to data through methods and data members.) Note again that throughout this function we are assigning values to variables that belong to the IPC Queue we created.

Lines 32-35 setup any scaling factors we may need to use. We initialize a local variable, scale, to a default scale of <1,1,1>. However, if the scaleEffect Boolean is true, then we get the scaling settings from our effector object, once again using the get() method, employing

Listing 1. The Item Motion Effector LScript.

```
01: warnings
02: version 1.3
03:
04: active;
05: epos,zone1,zone2;
06:
07: flags
08: {
09:   return(TRANSPARENT);
10: }
11:
12: newtime: frame,time
13: {
14:   active  HolePunchSactive;
15:   epos    HolePunchSposition;
16:   zone1   HolePunchSfulleffect;
17:   zone2   HolePunchSfalloffeffect;
18: }
19:
20: process: sa
21: {
22:   if(!active)
23:     return;
24:
25:   dist  vmag(epos -
 sa.wPos[1],sa.wPos[2],sa.wPos[3] );
26:
27:   if((dist  zone1)
28:     sa.transparency  1.0;
29:   else if((dist  zone2)
30:   {
31:     dist - zone1;
32:     sa.transparency  1.0 - (dist / (zone2 - zone1));
33:   }
34:   else
35:     sa.transparency  0.0;
36: } 01:  version 1.3
02:  warnings
03:
04:  expose position,
05:     fulleffect,
06:     falloffeffect,
07:     active
08:     as HolePunch;
09:
10:  scaleEffect;
11:  fullEffectRadius;
12:  falloffEffectRadius;
13:
14:  create
15:  {
16:     setdesc("HolePunch");
17:
18:     fullEffectRadius  5;
19:     falloffEffectRadius  5;
20:
21:     scaleEffect  false;
22:
23:     active  true;
24:     fulleffect  fullEffectRadius;
25:     falloffeffect  falloffEffectRadius;
26:  }
27:
28:  process: ma, frame, time
29:  {
30:     position  ma.get(WPOSITION,time);
31:
32:     scale  1,1,1;
33:
34:     if(scaleEffect)
35:        scale  ma.get(SCALING,time);
36:
37:     fulleffect  fullEffectRadius * scale.x;
38:     falloffeffect  falloffEffectRadius * scale.x;
39:  }
40:
41:  options
42:  {
43:     if(!reqbegin("HolePunch"))
44:     {
45:        error("Requester cannot be created without
Panel Services");
46:        return;
47:     }
48:
49:     c1  ctldistance("Full Effect
Range",fullEffectRadius);
50:     c2  ctldistance("Falloff Effect
Range",falloffEffectRadius);
51:     ctlsep();
52:     c3  ctlcheckbox("Effector active?",active);
53:     c4  ctlcheckbox("Tie effect range to object
scale?",scaleEffect);
54:
55:     if(reqpost())
56:     {
57:        fullEffectRadius    getvalue(c1);
58:        falloffEffectRadius  getvalue(c2);
59:        active          getvalue(c3);
60:        scaleEffect       getvalue(c4);
61:     }
62:
63:     reqend();
64:  }
```

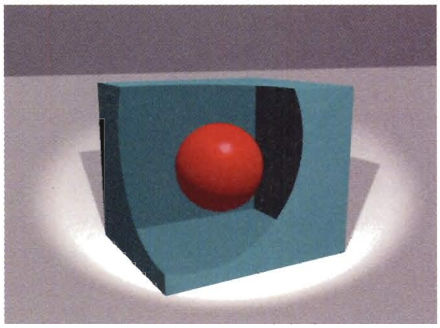


Figure 2. The "hole punch" effect applied to the cube's surface.

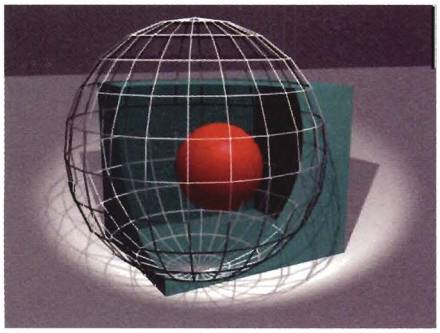


Figure 3. The visible effector object.

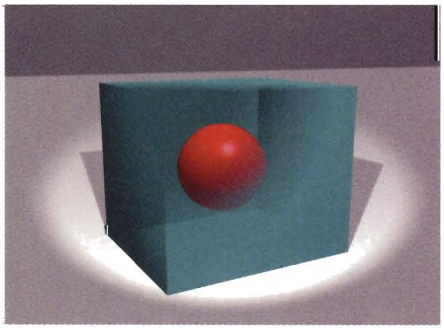


Figure 4. Using a "soft" transparency transition.

the SCALING selector.

Lines 37 and 38 perform the actual calculations that represent the effector itself. We calculate the effect radius by multiplying the scaling factor by the fullEffectRadius value. Remember I mentioned that our effector will be a perfect sphere. The reason for this is that a sphere is typically the easiest geometric form to use when calculating intersections and collisions. It becomes a simple, single-line distance measurement. This is a boon for scripts, because speed can often be measured by the number of instructions that must be interpreted.

The remainder of the script (lines 41 through 64) contain the options() interface. The user can alter the various operational parameters of the effector with this code. By now, you should be familiar with what is taking place in this function.

On The Surface

Listing 2 is the Procedural Texture LScript that constitutes the remaining half of the overall "hole punch" effect. It is applied to each surface in the scene that you wish to be influenced by your effector object. For example, in all the figures accompanying this article, the cube surface has the LS/PT script in Listing 2 applied. As you can see, only that surface is altered by the proximity of the effector object.

Lines 7-10 of Listing 2 contain the LS/PT flags() function. Some Layout LScript architectures require these types of callback functions so the script can provide information about how it wishes to function. In the case of Procedural Texture, the flags() function is used to tell Layout which attributes of the surface the plug-in will alter. In the case of our effect, we will alter the surface's transparency values, so we "flag" this to Layout by returning the TRANSPARENT pre-defined selector. All LS/PT flag selector values (such as NORMAL and COLOR) are documented in the LScript online documentation.

LS/PT also supports two more callback functions that we are not using in this particular script. The init() function is called by Layout in preparation of rendering, and is intended to allow a plug-in to perform any pre-render setup it might need. The cleanup() function is called immediately following a complete rendering sequence.

What Time Is It?

Line 12 is the start of the newtime() function. This function, unique to the LS/PT and LS/DM LScript plug-in architectures, is called when the linear time of the render advances-which is typically when a new frame is about to be processed by Layout. This organization is used, calling a specific function for each new frame, because the script's process() function will be called once per pixel (or once per point, in the case of LS/DM), instead of simply once per frame, as is the case with other Layout LScript architectures.

In the newtime() function, we query the IPC Queue of the effector object to get its values. We only need to perform this read of the Queue once per frame, so it is done in newtime(). In order to retrieve values from an existing IPC Queue, you need only preface the name of a particular slot with the name of the Queue, followed by a dollar sign operator ($). If for some reason the Queue or slot you refer-

Listing 2. The Procedural Texture Effector LScript.

```
01: warnings
02: version 1.3
03:
04: active;
05: epos,zone1,zone2;
06:
07: flags
08: {
09:   return(TRANSPARENT);
10: }
11:
12: newtime: frame,time
13: {
14:   active  HolePunch$active;
15:   epos    HolePunch$position;
16:   zone1   HolePunch$fulleffect;
17:   zone2   HolePunch$falloffeffect;
18: }
19:
20: process: sa
21: {
22:   if(!active)
23:     return;
24:
25:   dist  vmag(epos - sa.wPos[1],sa.wPos[2],sa.wPos[3]);
26:
27:   if(dist  zone1)
28:     sa.transparency  1.0;
29:   else if(dist  zone2)
30:   {
31:     dist - zone1;
32:     sa.transparency  1.0 - (dist / (zone2 - zone1));
33:   }
34:   else
35:     sa.transparency  0.0;
36: }
```

ence does not exist, or a value has not yet been placed into it, then a 'nil' value will be returned.

Pellucid Pixels

We use the values acquired in newtime() to determine the ultimate fate of the each visible pixel in the surface.

Line 22 checks to see if the effector object is active. If it is not, we simply ignore any processing for all pixels of this surface for this frame. Turning off the effector can help speed up your setup of the scene and test renders.

Line 25 calculates the distance of the pixel being processed from the center point of the effector. The vmag() function is called on the result of subtracting the effector position (in epos) from the pixel position. We acquire the pixel position from the Shader Object Agent that was provided to the process() function. Note that we use the world position (wPos[]) of the pixel because the effector position is expressed in these terms.

The remaining code in process() checks the result of the pixel distance calculation against the settings published by the effector. If the distance is less than the fullEffectRadius (contained in the zone1 global variable), then the transparency of the pixel is set to 100% (it reflects no light). This is accomplished by placing the value of 1.0 (equivalent to 100%) into the Object Agent's transparency value register.

Failing that, we then check to see if the pixel distance is less than the falloffEffectRadius (contained in the zone2 global variable). This test can only succeed if falloffEffectRadius is greater than fullEffectRadius. If the test does succeed, we calculate the percentage of transparency for the pixel based upon its position within this interpolation zone. This calculation takes place on lines 31 and 32.

Finally, if the pixel is outside all effector influence, it has a transparency value of 0% (it reflects all light of its particular color), and we set this on line 35 of Listing 2.

Transparency And Beyond

While it already performs a usable function, this effector system has some interesting further possibilities. Change other attributes of the surface to see what you can achieve!

The effector we created here is by no means the only way to create one. Indeed, it isn't even necessarily the "correct" way. However, if you can achieve the effect you need before your deadline, I'd say your efforts qualify as a success. Correctness becomes something best contemplated in the post-delivery glow.

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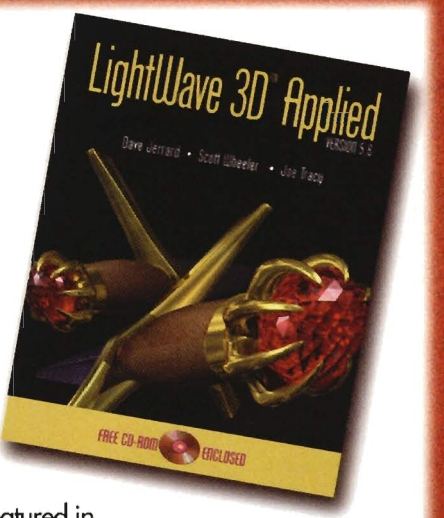

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Fun with Explosions: Part 1

BY DAVE JERRARD

Explosions seem to be a popular topic amongst animators, and pretty much anyone in the entertainment industry. We all like to blow things up and the bigger the boom, the better! Originally, physical scale models were used, but these had limitations in that they revealed their true size when they were destroyed. This drove some directors to use full size structures and blow those up, like the top levels of the building in Terminator 2. Now, LightWave 3D allows us to blow up virtually anything, from bugs to planets, and in a variety of ways, without the need to construct vast sets on studio lots. This issue, we'll create a generic explosion that can be used in a variety of scenes, and we'll finish it off with the 'shock ring' effect that's become so popular lately.

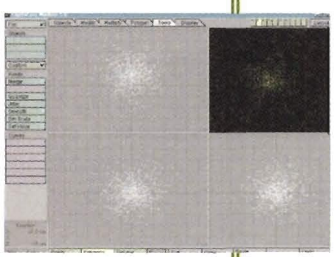


Figure 1. A small particle group that will be used to set up the explosion.

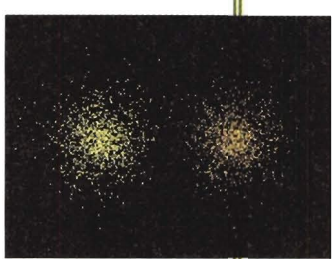


Figure 2. The same cluster, with a yellow surface on the left and with the fractal textures applied on the right.

1. We'll start our explosion by creating a cluster of particles, which we'll use to create the illusion of flaming sparks. Start Modeler and click the Tools tab. We'll create a cluster of 1000 points for now, and to do that we'll use the LW_RandPoints plugin under the Custom popup button here. On the panel that opens, click the Sphere button, then enter a value of 1000 and click OK. You will now have a cluster of points but no polygons. Click the Custom button again and this time, select the LW_Points2Polys plug-in. This will attach a single point polygon to each point, which will allow this object to appear when we render it (Figure 1). Finally, open the surface panel and create a new surface called Sparks, then click Apply.

2. Scale this cluster so it's approximately one meter across. If you haven't already, start Layout then go back to Modeler. Next, Use the Put command under the Objects tab and select the <<NEW>> option. Call this object Sparks-1000.lwo and click OK, then switch over to Layout. The object we just created will now appear in the center of the screen, ready to be animated.

3. Before we start animating, let's surface the object. Open the Surface panel and select the Sparks surface (it should already be selected). Start off by giving this surface a bright yellow color and increasing the Luminosity to 100%. Since this is a particle object, we don't want it to be influenced by any lights, so lower the Diffuse to 0%. This also makes the particles render with a softer look.

4. A test render right now will show a small cluster of yellow points. We'll give this flat looking cluster a sense of depth by adding some texture to the particles. Click the

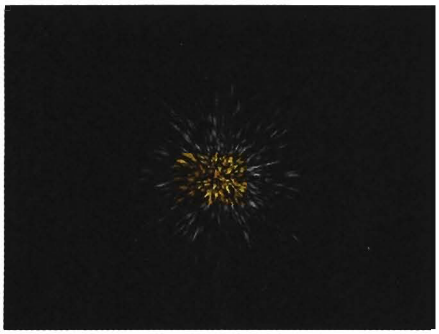


Figure 3. A single frame of a very simple explosion.

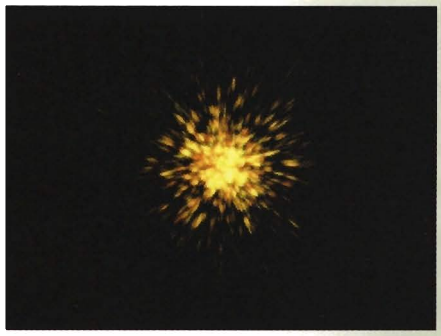


Figure 4. The same frame with glow added makes a much fiery explosion.

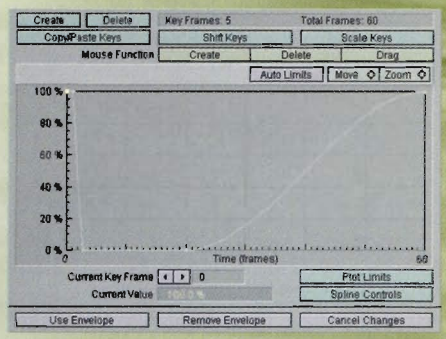


Figure 5. The dissolva envelope for the explosion.

texture button for the Surface Color and select Fractal Noise. We'll use this to give each particle a different color, so let's give this a Texture Size of 1mm. Larger values will create a more mottled look, with definite groups of points of various colors appearing, until only a single color is visible with very large sizes. We'll give this texture an intense red color, which when combined with the yellow base color, we'll have particles ranging from yellow to red, including all the various shades of orange in between.

Finally, we'll add some Fractal Noise to the Luminosity. Give this texture a size of 5mm so it's not the same as the color texture, or all we'll end up doing is make the red color appear darker. By keeping the sizes different, we prevent the two textures from being aligned with one another, which would basically render the color texture unseen. We'll leave the Texture Value at 50%. A new render will show a cluster of particles ranging in color from yellow to orange to red, with varying intensities as well. (Figure 2)

5. Now that we have our sparks textured, let's create the explosion. We'll cover the simple method first, which is to simply scale the object up from a size of 0 over a range of frames. First, scale this object to a factor of 0, and create a keyframe at frame 0, then again at frame 1. Click the Spline Controls button and activate the Linear option for frame 1. Next, advance to frame 60 and scale the object to a factor of 20 and create another keyframe here. That's it! Now, to see the results, you can create a preview, or just hit the Play button. You can fine-tune this explosion by adjusting the Object Scale at the second keyframe, and by moving the keyframe to another frame to adjust the speed and length of the explosion. Slower, longer motions give the impression of larger explosions, while short, fast ones look quite small. To render a frame, open the Camera Panel and activate Particle Blur. For better results, turn on Antialiasing and activate Motion Blur and Dithered Blur. Make sure the Camera is about 2 meters from the object, then render any frame to get an idea of what the explosion will look like (Figure 3). The best frames for this will generally occur before frame 10, depending on camera location.

This isn't bad for a start, but it still needs some work. For one, the explosion looks empty. We can fill it up in a few ways. The first thing we'll do is add some glow to

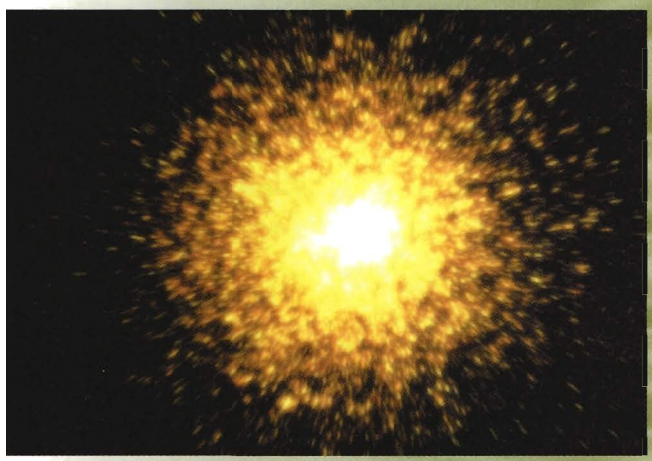


Figure 6. The addition of a cluster of smaller particles gives the explosion a greater sense of volume.

Figure 7. Three samples showing the various particle paths. From left: scaling the object, using a small displacement, and using a large displacement.

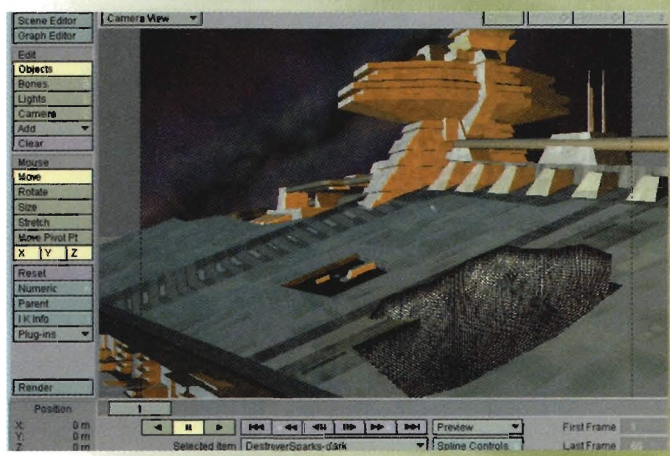


Figure 8. An array of points conforming to the shape of the hull of a ship, ready to be exploded outwards by a displacement map.

these particles.

6. Click the Advanced Parameters tab on the Surface Panel and set the Glow Effect to 40%, then open the Effects Panel. Switch to the Image Processing tab and activate Enable Glow Effect, then raise the Glow Intensity to 1000% and increase the Glow Radius to 12 pixels. This effectively gives our particles a glow intensity of 400%.

The Glow Radius of 12 works well for video but needs to be adjusted proportionally for other resolutions based on their linear sizes, not area. High resolution (1280 x 960), which has double the dimensions of video (640 x 480) would require a radius twice as large... 24 pixels, while low resolution, being only half the size of video, would only require a radius of six pixels. This is important to keep in mind when doing lower resolution test renders before switching to the final output resolution!

A test render now will show a denser explosion, with the glow concentrated mainly at the center where it gives the illusion of burning gasses, while at the same time it thins out around the edges and begins to 'clump' around the brightest particles (Figure 4). This effect is dependent on the camera position and zoom factor however. If the explosion looms too large in the frame, the glow will tend to break up into small clumps around individual particles. If the explosion is more distant, the glow can easily end up obscuring the explosion entirely, although this isn't necessarily a bad thing.

The explosion looks good so far, but we need to adjust the intensity of the particles or they'll just hang around forever after they're finished exploding. We also need to fix a small problem that occurs whenever we get a lot of particles in a small area of the screen, like we have at the beginning of the explosion. In this situation, LightWave can take a prohibitively long time to render these same particles, which on later frames may only take mere seconds. To solve this, we'll create a Dissolve envelope.

7. Open the Objects Panel and select the Appearance Options tab, then click the Envelope button for Object Dissolve. The first thing we'll do here is start the object off with a 100% dissolve at frame 0. We want the object to fade from view as it finishes its explosion, so hit the Enter key and create another keyframe at frame 60. Next, create a third keyframe at frame 2, since we don't want the object to be visible here yet. We do, however, want the object to be fully visible on frame 3, which is just as the particles begin to disperse. Create another key at frame 3 and change the Current Value to 0%, which will give the graph a sharp drop at the beginning, then a gradual slope back to 0% at frame 60. We'll delay that fade at the end for a bit and create another keyframe at 20. As we created these keyframes, you'll notice they all used the same value as the previous keyframe we were editing. All that's left is to step through each keyframe and set the Tension to 1.0 so we have a smooth 'S' shaped curve at the end of the envelope, as shown in Figure 5.

Note: The dissolve value does not have to be 0% for the visible portion of the explosion. To prevent distant or smaller explosions from rendering too bright, you can limit their intensities by keeping the objects partially dissolved at all times.

While we're here, save this envelope as temp.env since we'll be using this envelope a bit later. Now would also be a good time to save the Sparks object.

8. Now we just need to add a flash at the beginning of the explosion to give it more kick. To do this, we'll add a point light to the center of the explosion, not only to provide the flash, but also to simulate light from the explosion falling on nearby objects. Select Lights as the Edit Object, and reset the light's position and rotation values to 0, and keyframe it at frame 0. Open the Lights Panel and change the Light Type to Point Light and give it an orange color (255, 120, 10). Rename this light to Explosion Flash, then activate the Lens Flare button and click on the Flare Options. In this panel, deactivate everything except for Fade Off Screen, Fade Behind Objects, Central Glow and Red Outer Glow. Finally, we'll give this flare a bright 400% intensity.

9. We'll use the Flare Dissolve to adjust the brightness of the flare, rather than the Flare Intensity, so click the Envelope button for the Flare Dissolve. This will avoid the 'shrinking ball of light' effect that we would normally get with an intensity envelope. We only want a short, intense burst of light at the onset of the explosion, so we need to turn the light off at frame 0 by giving that frame a value of 100%. We'll make the flare brightest at frame 2, which is the frame before our particles become visible, so create a keyframe there and give it a value of 0%. Right now, if we rendered frame 1, we'd have a Flare Dissolve of 50% because we have an intensity ramp going from frame 0 to frame 2. Create another keyframe at 1 and give this a value of 100%. Activate the Linear option for the last two frames so our light 'pops' on at frame 2. Finally, we need to have this flare fade out over a few frames, so create another keyframe around frame 15 with a value of 100%, which will fade the flare out over a half second. Give the last two keyframes a Tension of 1.0 to make the fade smooth, then click Use Envelope.

Note: Since lens flares and the glow effect are both additive features, the combination of the two will result in a 'hotter' glow for the few frames that the flare is prominent in.

At frame 2, the flare still seems a bit weak in the center, even though it's at 400% intensity. We can create a more intense center by adding a second, less intense flare to the center.

10. In the Lights Panel, click the Clone Light button and rename the new light Explosion Flare. Enter the Lens Flare Options for this light and reduce the Flare Intensity to 100% so this flare is smaller. Open the Flare Dissolve envelope, then drag the last keyframe out to around frame 40 so it fades away a bit slower. Finally, since we've just created an extremely brilliant flash, we can add lens reflections to this flare, but this is entirely optional. Now a render of frame 2 will show an intense white center to the flare that we just couldn't get with a single flare.

11. Now we have two lights in the scene, but we only need one to actually cast light for now. For the Flare light, activate the No Diffuse and No Specular options so it will no longer affect anything else in the scene. Select the Flash light again and activate the Intensity Falloff. We'll leave the Maximum Range value alone for now, since that will depend on the scene that we use this explosion in. Generally, though, it should be about 10 times the radius of the explosion at its largest size.

12. All that's left is to envelope the light's intensity to match the explosion, so click the Envelope button to access the intensity graph. We've already created an envelope to control the intensity of our particles, so load the temp.env that we saved earlier. This envelope needs a couple quick adjustments before we can use it since it's currently the exact opposite of what we want, turning the light off when we want it turned on, and vice versa. To quickly flip the graph over, click the Shift Keys button and enter a value of -100 in the Shift Values field. Follow this by clicking the Scale Keys button and entering -1 in the Scale Values field and the graph will now be flipped over.

13. We now have a particle object and two lights in this scene, which will be a pain to move around later. Add a null object, then parent all three of these items to the null, then save this scene as Explosion-1.lws. You might also want to rename the null to something like Explosion Handle to make its purpose readily obvious.

14. OK, we have a nice explosion but it's still a bit sparse. To make it look better, we really should have at least a couple different particle sizes, and the only way to do this is to

Figures 9a, 9b, 9c. Three frames showing the effect of increasing the Texture Amplitude on the particle array quickly over time. Also note that an array of black particles was used as well to simulate debris.

add a second particle cluster. Switch back to Modeler and delete the contents of the current layer. Click the Get button and select the Sparks-1000.lwo object again. The reason we did this was so we have the updated surface information for the Sparks surface. Clear the layer again and then select the LW_RandPoints plugin from the Tools menu. This time, activate the Square and the Falloff buttons, then enter a value of 10,000. Next, run the LW_Points2Polys plugin, and follow this by typing "q" to apply the Sparks surface to this object. Finally, scale this cluster so it's about a meter in diameter, then save it as Sparks-tiny.lwo.

15. Switch back to Layout and open the Objects Panel. Select the Sparks-1000 object and create a clone of it. Now, select the clone (it will be at the bottom of the list with a '2' beside it) and click the Replace Object button. Select the new Sparks-tiny object, then click the Appearance Options tab and change the Particle/Line size to Small. We now have a second, more complex object that has the same properties as the original Sparks-1000 object, complete with all the original envelopes (Figure 6). Save this scene as Explosion2.lws.

Another reason to use more than one particle object is that it gives us even more control over the look of the explosion. Not only can we have particles of various sizes, but we can also adjust the timing of each particle cluster (to imply a series of detonations of varying intensity). We can also adjust the pivot points so clusters will explode outward in a specific direction (great for explosions erupting from a large surface), or even offset the individual clusters so the particles aren't seen to radiate from a single point. Experiment with various settings and particle combinations. In fact, even try adding a cluster of dark particles to simulate debris. Be sure to save the scenes that you like so you can use them later.

There's another way we can make these objects explode and have every particle travel in a random direction, rather than from the center. This will give the explosion a chaotic, more violent appearance.

16. Open the Objects Panel and turn on the Unseen By Camera option for all the Sparks objects except the original Sparks-1000 object we started with. Close the panel, then select the Sparks-1000 and remove the keyframe we set at frame 60, then reset the Object Scale at frames 0 and 1 so the object is back to its original size again. You might also want to deactivate Lens Flares on the main Lights Panel for the next few steps to see exactly what's going on.

17. Open the Objects Panel and click the Deformations tab. To make our particles explode this time, we'll use a displacement map and animate the Texture Amplitude. Click the Displacement Map button and select Fractal Bumps as the Texture Type and set the Texture Size to 10 millimeters. Next, click the Envelope button for the Texture Amplitude and set the Current Value to 0 at frame 0. Create another keyframe at frame 10, again, using a value of 0, and set the Spline Options for this frame to Linear. Finally create a last keyframe at frame 60 with a value of around 20. A preview of this will show a similar explosion to what we had earlier, but this time our particles will be crossing paths, creating a less organized explosion. Note: We set the second keyframe at frame ten here to create a secondary explosion, which gives the illusion of a much larger object being destroyed.

The main point to keep in mind is that the object must have some volume in order for the points to cross paths. If the object is scaled to 0 when the displacement starts, the result will be particles streaming out from a single point again, just like our original explosion. Also, when using a displacement to scatter our particle, a good rule of thumb is to use a Texture Size of less than 10% of the object's size. Larger values will tend to move large groups of particles in the same direction, as shown in the third example in Figure 7. The smaller the texture, the greater the scattering effect.

This method is excellent when used on an array of points that conforms to a specific shape, like a section of a hull that you want to have blasted away, or a logo. In Figure 8, an array of approximately 14,000 particles is placed over an opening that was created in the hull of the Star Destroyer. A single fractal displacement map was applied, with a texture size of 3 meters (it's a big ship).

As the displacement increased, the particle array was also moved outward from the hull to help control the direction of the particles and prevent them from disappearing inside the ship as they expanded. Figures 9a to 9b show the results of this displacement, and reveal a splashing liquid-like effect as the array begins to deform in various directions. The Frequencies also contributes to the final look of the deformation. Lower values will create more angular deformations while higher frequencies give a smoother, undulating appearance. A value of 6 was used for the examples shown.

A second particle array consisting of solid black particles was also added to provide both the illusion of debris as well as to help prevent the glow effect from becoming too bright, particularly over the lighter areas of the ship's hull. The dark particles also add more texture to the glow and

create a smoky, billowing effect.

Let's get back to our explosion again. A popular explosive effect that has been popping up on big screens lately has been the expanding 'shock ring', made famous in "Star Trek VI," though the effect originally appeared in Japanese animation in the early 80s. It's a cool effect, which means someone's going to want it, so let's create one here.

18. The first thing we need is a ring, so hop back into Modeler and open a new layer. Before we even start on this, we need to put some thought into how this should look. We know that as the ring expands, it should have an intense leading edge, which gradually dissipates in a fiery trail. To create this fiery effect, we'll need to model the ring in such a way that its shape will affect how its texturing will behave. We know that we can set a falloff for textures on any axis, but by building our ring to cut through this falloff at a certain angle, we can affect the direction of this falloff. We also want the ring to have some thickness so we can see it from the edge, so we'll rough out our ring by selecting the Pen tool and creating a simple triangle in the face view using the following values:

Point #	X Axis	Y Axis
5	4 cm	2 cm
2	80 cm	0 cm
3	54 cm	-2 cm

This creates a rough profile for our ring, so let's continue by lathing it. Make sure you're in Polygon Edit mode, then open the Lathe tool and select the Y-axis. The default values will do for now, so click the Reset button, click OK, and then hit Enter to perform the lathe. We don't need to worry which way the polygons are facing since we'll be making this surface double sided later.

19. We'll finish the construction of the ring by deleting the innermost polygons, which we won't need, as shown in Figure 10. Once these are gone, we'll smooth the ring out by hitting the Tab key to convert the ring to MetaNURBS. Type "o" to open the Data Options Panel and set the Patch Division to 8. This tells Modeler to divide each patch into an array of 8 polygons by 8 polygons, which will give us a very smooth ring. Next, click the Freeze button under the Tools tab to convert the MetaNURBS to polygons. Finally, open the Surfaces Panel and give this a surface name of ShockRing, then save the object with the same name.

20. Switch back to Layout and clear the scene, then load the ring we just created. Open the Surfaces Panel and activate the Additive, Smoothing and Double Sided check boxes, then raise the Luminosity to 100% and lower the Diffuse Level to 0%. Next, change the Surface Color to black and open the Color Texture Panel. Now, select the Fractal Noise texture and give it a Texture Size of 10 cm and make the color a yellow-orange.

Right now, we'll just have a standard fractal pattern that covers the entire ring, but we want this texture to fade out towards the inner edge of the ring. When we created this ring, we gave it a thickness of 4 cm, and since the inner edge of this ring is also its thickest point, if we applied a falloff on the Y-axis, then the texture would seem to fade towards the center. A quick way to 'fit' our Texture Falloff to the object is to simply divide 100 by half the ring thickness (we want the falloff to be applied to the top and bottom halves). We can also just type in "100/0.02" for the Y-axis Texture Falloff field,

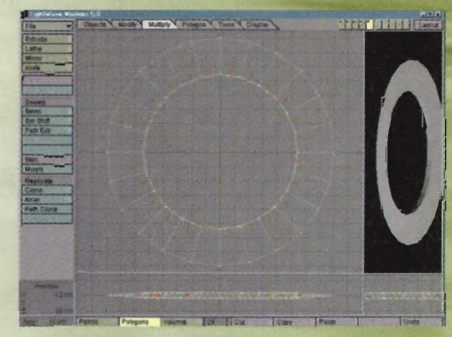


Figure 10. The rough beginnings of a shock ring. Note the seleced inner polygons, which will be deleted.

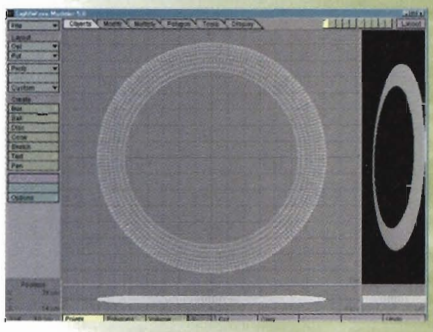


Figure 11. The finished shock ring, after freezing the MetaNurb object.

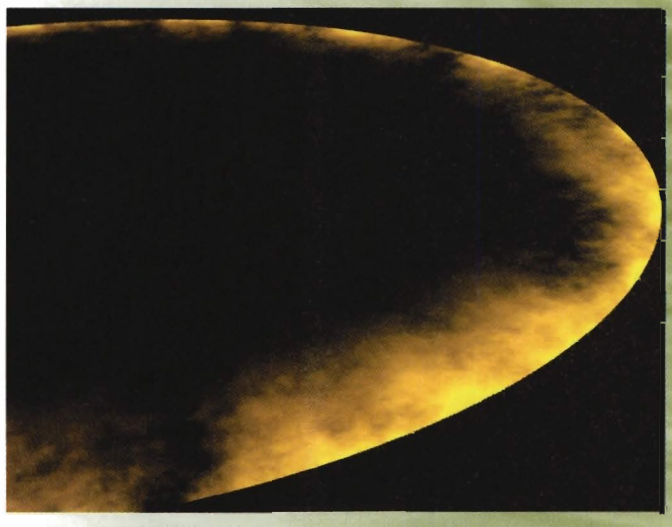


Figure 12. A simple fractal color texture with a falloff on the Y-axis. Note how the outer edge seems to have gaps in the texture

which LightWave will replace with 5000. A test render of the ring now will show what looks like a ring of fire that's being blown in toward the center (Figure 12).

That's not too bad, but since we used Fractal Noise, we have a few random gaps around the leading edge of the ring. We really want that edge to be more solid and we can do that by applying a marble vein along that edge instead of using Fractal Noise.

11. Change the Texture Type to Marble and make sure that the Texture Axis is set to Y, then enter the following values:

Texture Opacity: 100%
Texture: Marble
World Coordinates: On

Texture Size	Texture Center
X: 5 cm	X: 0 m
Y: 5 cm	Y: -3 cm
Z: 5 cm	Z: 0 m

Texture Axis: Y axis
Texture Color: 255, 75, 20
Frequencies: 6 (or higher)
Turbulence: 0.2
Vein Spacing: 0.06
Vein Sharpness: 5

We set the Vein Spacing to 6 cm so that we'll only have a single vein running through the object (which is 4 cm thick). Since the center of the marble texture is located between two veins, we need to offset the center by half of our Vein Spacing amount in order to position a vein along the center of our ring. Also, instead of using a Falloff value, we used the Vein Sharpness and the Turbulence to keep the vein from getting too thick and running off the inner edge. Play around with these two values to see how they affect the appearance of the ring.

12. Since we can control the width of the vein by adjusting the sharpness, we can further enhance the ring by adding a second, narrower vein over the current one by adding a second texture layer. Click the Add New Texture button and select the Marble texture again. This time we'll create a brilliant yellow vein to give our leading edge a hotter look.

Texture Opacity: 100%
Texture: Marble
World Coordinates: On

Texture Size	Texture Center
X: 2 cm	X: 0 m
Y: 2 cm	Y: -3 cm
Z:2 cm	Z:0 m

Texture Axis: Y axis
Texture Color: 255, 250, 50
Frequencies: 6 (or higher)
Turbulence: 0.07
Vein Spacing: 0.06
Vein Sharpness: 7

Note that the Texture Size is smaller than the first layer. This gives the yellow texture a slightly smaller, fiery look, which then fades into the larger orange texture that's below it, creating a sense of depth. More texture layers may be added, if so desired, with a couple rules to keep in mind: Sharper veins should always be added on top of wider veins, and they should also have a smaller texture size.

13. Now that we have a fiery texture, let's bring it to life. Advance to frame 60 and stretch the ring to a factor of 5 on both the X and the Z-axes, but keep the Y factor at 1. Since we have World Coordinates on, if we scaled the object on the Y-axis, it would start to show the marble veins that run above and below it as it increased in size. Create a Keyframe here, then render a few frames (or create a small animation) and watch the texture closely.

You will notice that as the ring expands, the texture not only changes, but also appears to trail behind the leading edge, much like an expanding ring of fire. Also, the texture size is unaffected by the scaling of the ring, so our 'flames' have a constant size, which is dictated by the Texture Sizes we applied. What is happening is as the ring expands, the polygons are pushed outward, moving through the marble veins, so at each frame, we see a slightly different 'slice' of the texture on the surface. The trailing effect is created by the way the wide sloped polygons on the top and bottom of the ring move through the texture, showing a much longer slice of the texture than the leading edge. (Figure 14)

14. Now that we have our ring created, save the object, then load the original explosion scene again. Load the ring again and open the Surface Panel again. Remember that when we added the Marble textures, we applied World Coordinates to allow the ring surface to move through the texture. However, if we were to move or rotate this ring, the texture will not move or rotate with it, which will completely ruin the effect. To fix this problem, open the Texture Panel for the first marble texture and click the Add Reference Object button. Next, go through all the other textures for the ring and set the Texture Reference Objects to the same Ref Obj. Close the panel and parent the ring to this Ref Obj, then parent the Ref Obj to the Handle Null.

What we've just done is created a reference null so that when we move the explosion assembly, the ring's textures will follow. Additionally, by parenting the ring to the Ref Obj, we can adjust the size of the ring's texture by scaling the null. We can also rotate the ring by rotating the Ref Obj, without affecting the rest of the explosion assembly, so now we can have the ring expand, anywhere, and at any angle, without worrying about the texture 'slipping' off.

15. Now we just need to set up the keyframes to make our ring expand to match the explosion. At frame 0, stretch the Ring to a factor of 0 on both the X and the Z axes, being sure to keep the scale factor for the Y-axis at 1. Create a second keyframe with these same values at

frame 10 or so, and activate the Linear option for it. Next, create a final keyframe at frame 60 and set the X and Z scales to somewhere around 10. Finally, render a frame to see the ring combined with the particle explosion.

16. Before we're finished here, there is one more detail that needs attention. If a section of the ring passes over the main explosion, it will block out the glow effect that we have applied to the particles (Figure 15a). To allow the glow to show through the ring, open the Surface Panel again and click the Advanced Options tab. Click the Alpha Channel button and select Constant Value, then enter 0 into the Alpha Value field beside it. This will now allow the glow to show through the ring (Figure 15b).

17. Now that our explosion is all set up, save the scene as well as all the objects to be sure we don't lose any textures, and we're done! By now, you will have noticed that we have been setting keyframes at frame 1 as well as frame 0. This was done to make loading the explosion into other scenes easier. When you set up a scene that you'll be applying the explosion to, load the explosion scene we just created into a second instance of Layout. Then use the Shift All Keyframes option on the Scene Panel to match the timing of the main scene, then save a temporary scene file.

For instance, if your main scene has a ship that explodes on frame 120, then load the explosion scene we just created here into a second Layout, then Shift All Keys by 120 frames. Save this scene as a temporary scene file, then go back to the ship scene and use the Load From Scene option. Select that temporary file and you will only need to position the Handle Null. The explosion itself will already have the correct timing on all the elements, saving you from having to adjust a dozen or so motion envelopes.

By having a duplicated keyframe on frame 1, when the Shift All Keys is applied, every motion graph will have a linear motion between frame 0 and the first frame of the explosion. Since these are identical, no change will take place between these two frames. Without this duplicated keyframe, unwanted motion can occur between frame 0 and the first shifted keyframe.

This is just one of many possible methods for creating explosions. Later, we'll add other effects to simulate gravity and voluminous effects to the explosion. For now, have fun with this one, and pay attention to how that ring works. It has a lot of possibilities that aren't obvious at first glance.

Dave Jerrard is the lead tutorial writer for NewTekniques *Magazine, and is one of the authors of*

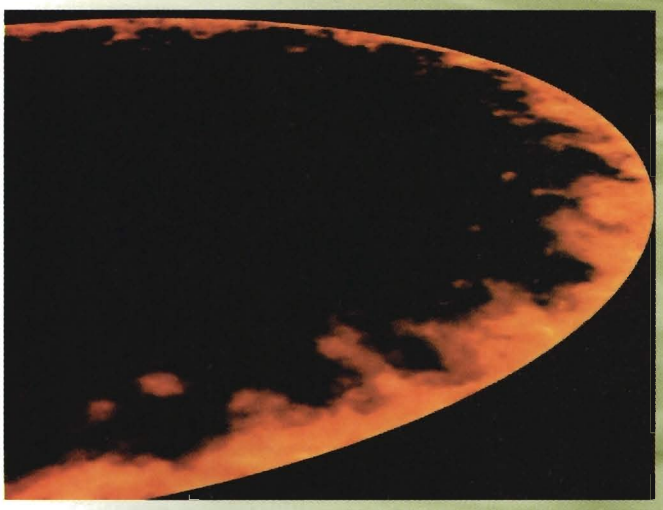


Figure 13. The same ring, this time using the marble texture. Note the solid leading edge the marble texture creates.

Figure 14. A cross section of how the ring surface intersects the marble texture (bottom) and how the texture appears on the ring surface (top). As the ring expands outward (moving left to right), the surface moves through the marble texture, creating an ever-changing trailing effect.

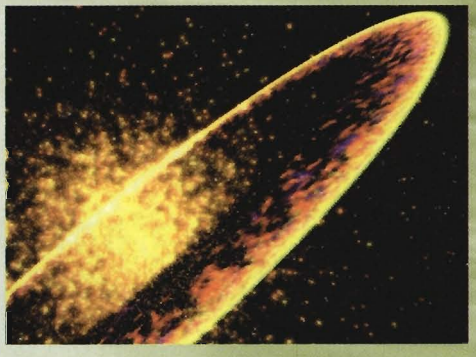


Figure 15a. The shock ring combined with the particle explosion. Note how the ring obscures the glow effect on the particles behind it.

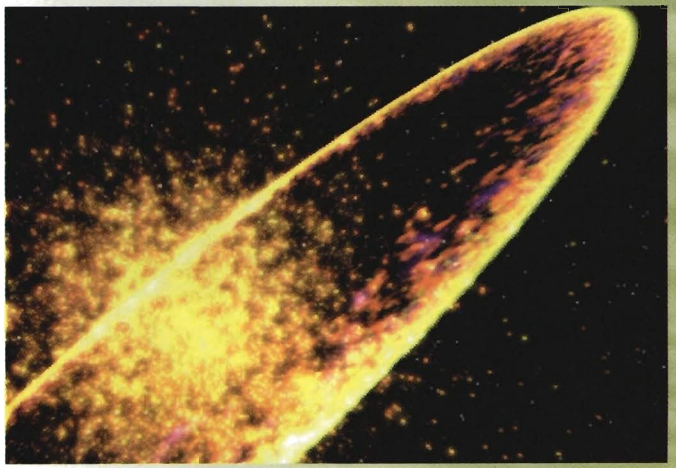


Figure 15b. By setting the ring's Alpha Channel to a value of 0, the glow effect shines through unobscured.

WAVE F/X

LIGHTWAVE SUCCESS IN THE COMPETITIVE TV & FILM F/X MARKET

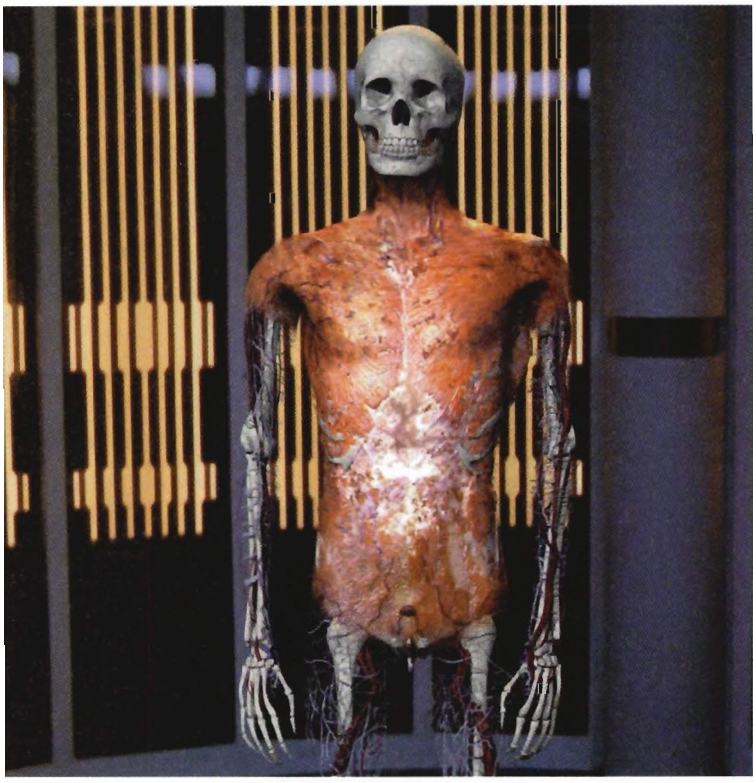
A deeper look into the effect sequences of two "Star Trek: Voyager" episodes, courtesy of Digital Muse.

"DOWN DEEP" AND "LATENT IMAGE"

STAR TREK: VOYAGER

BY GREG NELSON

Last year, a friend of mine was working on "Star Trek: The Experience," a casino ride in Las Vegas. Among other things, he'd been asked to edit a series of video montages for visitors to watch while standing in line for the ride.



A LightWave 3D CG detailed body, built by Digital Muse for the "Latent Image" episode of "Star Trek: Voyager."

As I sat there watching his compilations of the entire "Star Trek" genre, it struck me that not only was this a review of a television/film series that goes back almost 30 years; it was a very detailed chronology of special effects.

I remember sitting there watching the progression of the Enterprise through all its different versions and being able to pick out the year the effects were done, just by their look.

By today's standard, some of the effects look, shall we say, "classic," and some still hold up quite well. But nevertheless, whether you like "Star Trek" or not, it's quite obvious that those involved with its production are passionate about always pushing the effects envelope.

Now, it's no secret that many effects companies have worked on a Star Trek or two, and I won't say that one company's work is better than another's. However I will say the passion for pushing effects to the edge exists at Digital Muse in Santa Monica, Ca.

I got the opportunity to sit down with two of Muse's top animator/supervisors, Bruce Branit and Matt Merkovich. These are two guys you want on your team. They love what they do, and it reflects in the quality of the work Digital Muse turns out for "Star Trek: Voyager."

We spent a couple of hours talking about two different "Voyager" episodes. They also asked me to mention John Gross's article in this issue's online area about an amazing battle sequence they did on a "Star Trek" ride film, in which they had one weekend to start and finish it.

Now, I don't get a lot of time to just sit back and watch TV anymore, but looking at some of Muse's work from the "Voyager" episodes makes me wish I did.

The first episode, "Down Deep," is a rather significant departure from the established look and feel of "Star Trek," in that it takes place largely underwater. The premise of the show is the "Voyager" crew visits a planet that is made up entirely of water. One of the "Voyager" shuttle craft spends most of the episode under the surface of the water doing what "Star Trek" is famous for, getting its characters in and out of impossible situations.

An effect shot from the "Down Deep" episode of "Star Trek: Voyager."

Now, you might think doing underwater sequences should be a piece of cake for a company that has so much "SeaQuest" experience; unarchive an old scene, replace Seaquest.lwo with shuttlecraft.lwo, hit F10 and deliver it. However when the production company says "we specifically don't want it to look like `SeaQuest,'" well, that changes things a little.

One of the shots Matt and Bruce are most proud of is where the shuttlecraft splashes down. Now, when it comes to doing water and splashdown sequences one might think Hypervoxels is the answer. However, as with so many of the top LightWave 3D animations, this scene is LightWave straight out of the box and relatively plug-in free.

"I love Hypervoxels," Matt said, "but it was taking too long and I wasn't getting the look I wanted."

One of the coolest effects in the sequence is an underwater shot where the shuttle breaks the water's surface. There are so many elements in this shot, but one of the most impressive is the streams of bubbles preceding the shuttle and shooting down toward the camera.

To do this effect, Matt built several thin tubes of polygons on to which he applied procedural noise to the object's surface that travels up the Y axis. He also applied some Particle Storm particles surrounding the object to take the CG edge off. Then he applied a rippling displacement map that travels up the Y axis. In addition, he incorporated a chain of bones that allows the tube object to snake around as it shoots down into the water. That combination makes the effect very easy to control and dramatically cuts down on the amount of testing time.

Another effect Matt developed for this shot is steamer-free volumetric shadowing. As the shuttle enters the water, it casts shadows where it is blocking out the light. For the highest level of control, he created multi-segmented tubes of polygons for the X,Y and Z axis so he could animate them individually. Each tube is based on the outer-most points model's outline in the front, top and side views in Modeler. Once those points are cut out, connected and extruded in Modeler, Matt then took the tubes into layout, and applied the shuttle's motion path to each one. Since the tubes are relatively transparent, it makes the shadows a subtle yet necessary addition to the scene.

For added hints of realism, Digital Muse likes to run its shots through a special flow they've designed in Digital Fusion. This flow complements the CGI by softening edges and increasing a glow around the objects that is very representative of the way film reacts when it is exposed to light.

In the "Voyager" episode "Latent Image," Bruce and his team were given the task of photorealistically building an actor's body from the inside out. The shot required the body to build itself bone by bone, organ by organ and nerve by nerve until the actor's skin and ultimately his uniform revealed itself over his body's internal components.

One of the hallmarks of good animation is the detail work. The animators on this shot went to great lengths to make sure bones (models of bones, not layout bones) and the internal organ structure are the proper size and length and positioned exactly in the actor's pose. If these details aren't taken care of in the beginning, the shot will never look right.

To gain additional realism, Digital Muse went out and got pictures of internal organs, scanned them and used them as image maps on the organ models.

The effect is designed to represent the way the scanner, used by the ship's doctor, checks through each of the body's internal systems. So as the scanner processes through the cellular structure of the bones, it then moves on to the heart and the brain, the lungs and so on.

To do this effect, the animators used the Steve Worley plug-in "acid." The way acid is set up, it allows you to apply it to individual surfaces and define acid's sphere of influence on the surface over time. So, when you expand acid's area of influence in the transparency channel to the point where the surface is invisible, and then shrink that area of influence over time, the effect will look as if the object is burning itself on.

For the multi-layered effect, Muse's animators set up several different channels of acid with different timings, allowing the individual organs to reveal themselves as defined by the shot requirements.

As a series of television and films, "Star Trek" in all its incarnations continues to set trends in the development of special effects. I encourage you to check out the work being done on this show, because the people working on it are some of the best in the business.

Seeing their work and the passion they bring to it is always an education on how to do it right.

Greg Nelson just finished several effects shots for Threshold Entertainment on "The Faculty." You can email him at kidneyboy@msn.com.

LightWave 301

A UNIVERSITY-LEVEL COURSE WITH INCREASINGLY DIFFICULT LIGHTWAVE TECHNIQUES

Alien Abduction

By
Scott Wheeler

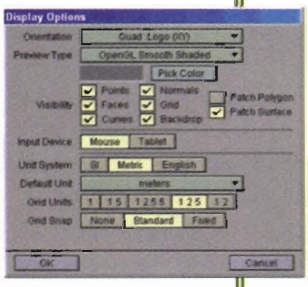


Figure 1

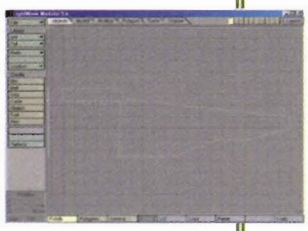


Figure 2

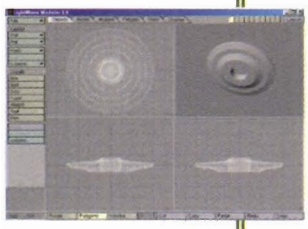


Figure 3

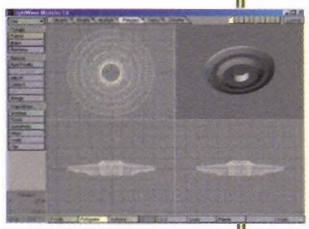


Figure 4

Welcome back to another year of LightWave 3D courses. This year we will be adding object hierarchies and plug-ins like Steamer to our skill set. It should shape up to be a fun year for all, so let's get to it.

As the name implies, this year we are going to be making a UFO abduction scene. The finished product will have a poor unsuspecting car being lifted aboard an alien spacecraft by a strange whammy beam (see the cover of this issue). Our first order of business will be to create the UFO.

1. Lets get the boring stuff out of the way first and make sure we are all using the same measurements. Open Modeler and go to Display Option [d]. Verify your settings match Figure 1.

2. Since most UFO's are a saucer shape we can easily make one by plotting out a profile and then use the Lathe [Shift – l] tool. Maximize the Left View and plot out the following points in order :

Point #	X	Y	Z
1	0m	3.5m	0m
2	0m	3.5m	4.5m
3	0m	2.5m	6m
4	0m	1m	20m
5	0m	0m	20m
6	0m	-1m	16.5m
7	0m	-1m	13.5m
8	0m	-2.5m	10m
9	0m	-2.5m	5m
10	0m	2.4m	5m
11	0m	2.4m	0m

When you have finished plotting down the points, make them into a Polygon [p]. Your view should now look like Figure 2. Before we move on to building more of the ship, Save [Shift – s] the profile as "UFO_Profile.lwo". We will need it later when we add some detail and moving parts to our craft.

One thing you will notice immediately is that there is a large hole in the center of the ship. This is the cargo hold of the ship. Since we will not be seeing the top part of the UFO in our shot, it does not matter that we have left little room at the top. It will simply be implied that there is more ship above to accommodate the large hold.

3. Activate the Lathe Tool [Shift – l] and open its Numeric Values [n]. The UFO should appear to be a smooth surface so we need to make sure we use enough segments when we Lathe it. Enter in the following values:

Start Angle: 0.0
End Angle: 360.0
Sides: 72
Offset: 0m
Axis: Y
Center: (0,0,0)

Click OK and Make [Return] the Lathe. Size To Fit [a] the window to show the whole UFO and Deactivate [Space Bar] the Lathe Tool. If all went as planed the ship should look like Figure 3.

4. Our next step helps to reduce the polygon count, which is always a good thing. In Polygon Selection Mode [Ctrl – h] place the mouse pointer at (X: 0m, Z: 0m) and click down. This should select 144 polygons from the top of the UFO and the top of the cargo hold. To reduce the number of polygons we need to

Merge [Shift – z] the polygons together. This should give you one polygon on the top of the UFO and one on the top of the cargo hold. Your UFO should look like Figure 4.

We can do some quick object cleanup by switching to Points Mode [Ctrl – g], pulling up the Statistics Panel [w], and selecting the "+" next to the 0 Polygons line will highlight the now orphaned points. A simple Cut [x] and our model is back on track.. Now would be a good time to Save [Shift – s] what we have so far as "TowTruckUFO.lwo".

5. With our basic shape defined we can move to some preliminary surfacing. First, make sure there are no polygons selected by pressing the [/]. Pull up the Change Surface Panel [q]. Since we have no polygons selected Modeler assumes that all polygons are therefore selected. This allows us to make a full surface change on the whole object without having to select anything. This first surface we need to apply is the "TowTruckUFO_Body". Enter the following values:

Surface: TowTruckUFO_Body
Color: R: 73
G: 72
B: 98
Diffuse: 100%
Specular: 100%
Glossiness: 16
Smooth: On
Smoothing Angle: 10
Close the panel by clicking on Apply.

Now that we have the base color of the UFO we can start making it a little more visually exciting. We will be doing this in three separate stages; first is to add detail to the current model, second is through the addition of nurnies (small detail pieces stuck onto the model to make it look more complex) and third will be through the addition of several moving parts.

6. One of the quickest ways to add more interest is by making some separate surfaces. The first area we will concentrate on is the cargo hold. Since all UFO's of any stature have a brightly-lit area to take all their abductees, we should add one. To do this zoom into the center of the model in the Top View and select an area similar to Figure 5. This selection also encompasses the top of the UFO as well, so make sure you deselect it by clicking on it in the Face View. You should now have 73 polygons selected.

7. With the 73 polys selected bring up the Change Surface Panel [q] and enter the following :

Surface:
TowTruckUFO_ HoldOpening
Color : R: 77
G: 72
B: 242
Diffuse: 100%
Specular: 0%
Glossiness: 64
Smooth: On
Smoothing Angle: 89.5

Continued on page 47

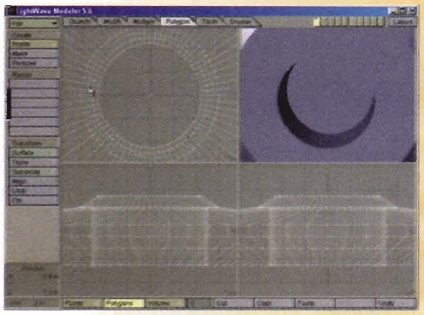


Figure 5

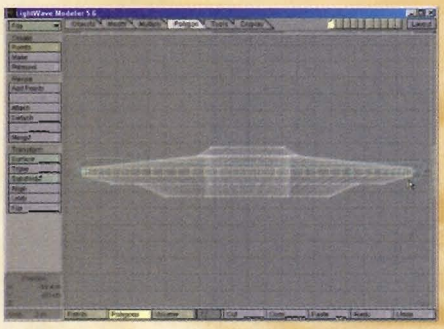


Figure 6

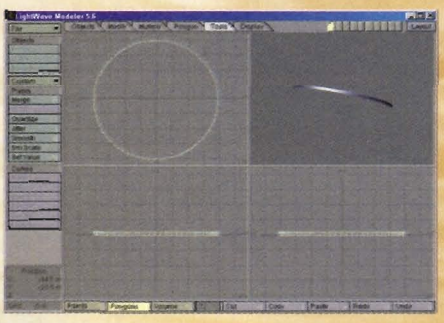


Figure 7

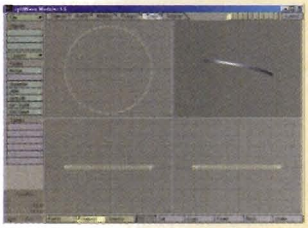


Figure 8

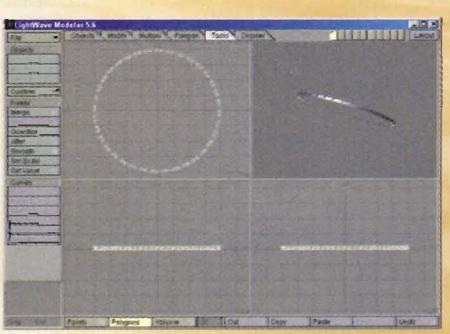


Figure 9

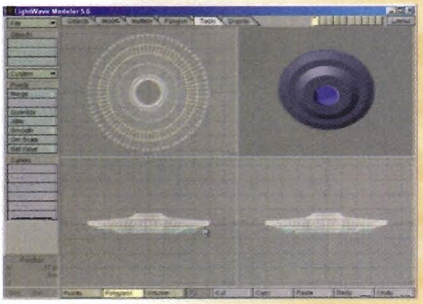


Figure 10

Year Four

CLUB TOASTER

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Attention Toaster/Flyer Users:

After almost a year in development we will release a new year of *Club Toaster* on **March 24th**. Included will be our largest graphic library ever of backgrounds, animations, fonts, brushes, overlays, color wipes, soft edge wipes, textures, and moving backgrounds.

In addition, we have added a full color **PRINTED INDEX** so that you can locate instantly any graphic, wipe, or font that you need. Also included is a **TUTORIAL VIDEO** that takes you step by step though installing and using each category. The video will also serve as a quick reference for all the moving backgrounds on the CDs.

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Circle #203

The Gateway

First Words

With so many Amiga print magazines having ceased publication, it probably came as a total surprise that *NewTekniques* would announce that it was expanding to include a new section dedicated to the Amiga, Video Toaster and Video Toaster Flyer.

Unfortunately, most of us have become so accustomed to hearing bad news about the Amiga, that when something good is heard we never know what to think of it. Do you believe it, or is it just more toss for the growing heap?

There has been a great deal of concern about the direction that Amiga International and Amiga Inc. are steering in—a destination that nobody is able to see with any certainty, including those at the helm. It often seems as though everyone is speaking a different language, and although the universal translator is working, the words do not quite make sense to everyone.

"Amiga when the walls fell, with glory. Amiga with hearts broken, and unturned."

As long as no one is able to make sense out of the obvious, our world appears to be getting smaller and smaller. But, the Amiga seems to have built up an immunity to the extinction that the world seems insistent on forcing upon it, and those of us who have had the good fortune to be a part of this great community, stand proud as our close friend tries once again to put another brave foot forward.

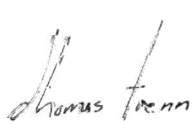
And in doing so, Amiga life continues on...regardless of whether anyone quite understands.

When Joe Tracy told me that "The Gateway" received the go-ahead, there was no question in my mind as to the team of people I wanted to be a part of this new venture. So, here we have brought together a troupe of professionals and believers who are both ready and willing to entertain, teach, advise, inspire, inform, and even dazzle you.

These are the people who I most admire for their extraordinary talents and their dedication to the Amiga. Without them, this would have just remained a dream. So to them, I send my heartfelt thanks for helping make this a great reality.

Last words...

"Amiga at The Gateway, with arms wide."



Dhomas Trenn, Believer

"The Gateway Online"

Along with adding this new section for Amiga, Video Toaster, and Video Toaster Flyer users, *NewTekniques* has also created a special bonus area for readers called "The Gateway Online." The bonus area is available now at www.newtekniques.com/thegateway/.

Many of the articles you read here contain additional content in "The Gateway Online." You'll also find new articles, columns, a glossary of technical terms and buzzwords, Web resources, and columnist bios.

Online columns include "ImageFX," "The Idea Factory," a hardware solutions column, and a tips column. Columnists include Jason Compton, Bob Ketchum, Tim Roberts, Gary Heller, Kevin Hanley, Greg Scott, and Cecilia.

Revised Flyer Manual from NewTek

NewTek has announced that it is rewriting its Video Toaster Flyer manual with improved and updated information for new users to learn the system. The manual is expected to ship with new Flyer boards in March. The rewriting project is headed by Chuck Baker, the head of customer service at NewTek.

ImageFX PPC Addition

Kermit Woodall, from Nova Design, announced on the ImageFX mailing list that Nova Design will be releasing a PPC add-on (PowerUP only) for its ImageFX image processing program.

Free Mac Emulator Released

Christian Bauer has released verson 3.10 of his Shapeshifter Macintosh-II emulator program, which is now available for free. It can be downloaded at www.uni-mainz.de/~bauec002/SSMain.html.

New Release of CyperGraphX

The CyberGraphX retargetable graphics system is no longer being supported by Phase5. However, a new version 4.0 update is now available commercially on CD-ROM. Enhancements include VESA display modes, a monitor database, a configuration program, bitmap cache support, online help and various bug fixes. Users of previous versions can take advantage of special upgrade pricing. More information can be found at the support site, www.vgr.com/v4/.

AmigaOS Feature List Changes

The new features list for AmigaOS 3.5 has been changed. Retargetable graphics and audio support is no longer being included. What will be included is Internet capability, "modern" printer support, PowerPC co-processor support, a new look for Workbench, an enhanced graphic user interface (GUI), a more productive shell environment with new AmigaDOS commands, a new file system with support for hard drives larger than 4GB, a CD file system with audio CD playback, and enhancements to the ARexx scripting language. The OS upgrade is expected to ship early this summer at a price of $49.95.

Netscape 5.0 Amiga

Netscape 5.0 will make it to the Amiga platform thanks to "The aMozilla Project." The project is the result of Netscape opening up its code to developers. Programming started on January 1, 1999, and will most likely be finished in the year 2000.

NewTek to Exhibit at Amiga '99

NewTek has confirmed that it will be exhibiting at Amiga 99—The Gateway Show from March 12 - 14 at the Henry VIII Hotel in St. Louis, Missouri. Details of NewTek's exhibit plans were not available at press time, but it is believed that the focus will be on NewTek's Video Toaster and Video Toaster Flyer. The three-day event includes exhibitors, seminars, classes, and a banquet with the guest of honor being astronaut Steve Nagel. For more information, access *NewTekniques'* InfoTek service at www.newtekniques.com/infotek and select "Expo Events."

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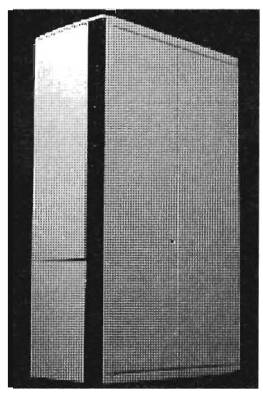

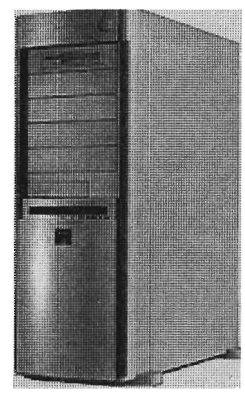

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Circle #204

Software Upgrades and KISSing Techniques

By Chuck Baker

Welcome to the first installment of Toast Master. Your regular columnist, Bohus Blahut, will join us in the next issue. I have been given the honor of inaugurating this column dedicated to the device that launched the desktop video revolution nine years ago... the Video Toaster.

This past spring, NewTek made the decision to drastically reduce the price of the Video Toaster, and to ship the venerable warhorse with both the v3.5 and v4.2 versions of the software. The price cut is the result of a reduction in manufacturing costs and having recouped the technology's development costs.

Why ship the older version of the software in the update? Very simply, because each version has particular strengths to offer the user. Some users may decide that one particular version meets all their needs; but, most will find ways to apply each version.

How did NewTek come to the conclusion that users might want both versions? From the users themselves. In analyzing how Toaster owners were using their systems, NewTek's managers found that most purchasers of the latest update, v4.2, were retaining v3.5 on their systems. Major reasons for this included compatibility with many third party linear editing products (which have never been updated for v4.2), perceived better operation in live production work, and to maintain capability to re-use or re-do existing client project work. Reasons for wanting to use 4.2 included the improved Character Generator (CG), ToasterPaint, and LightWave programs, as well as the new storyboard editor, which is capable of creating custom effects, Framestore, and CG banks for live production and slideshow playback.

Many Toaster owners are still using v1.0 and v2.0 software. Those who buy the update package will find that they can go to work immediately in the familiar and comfortable v3.5 environment, which is much like the earlier versions. At the same time, they can learn the v4.2 system and discover how best to apply it in new projects.

NewTek made a few changes to make it easier for these two versions to coexist on one system, with minimal worry for the user. The 3.5 and 4.2 versions of the character generator use different PostScript libraries for PostScript support; so, the icons that launch the programs were modified to make the appropriate library active. The installation for the v3.5 software now creates an assignment in the user-startup file for the device "VT35:" and the configuration scripts for the Toaster v3.5 programs were modified to use that assignment. The v4.2 software also creates an assignment in user-startup, which the configuration scripts for the v4.2 programs use.

NewTek also added a special feature for LightWave users. The 3.5 and 4.0 versions of LightWave must render a complete image into a buffer in RAM, so that post-processing plug-ins can be applied. On systems with limited RAM, images with resolutions higher than 752 x 480 pixels cannot be rendered. So that users who need to render print resolution images in limited RAM may do so, NewTek has included Layout v3.2 which uses LightWave's original render buffering scheme to render print resolution images in strips, writing them to the hard drive until the complete image has been rendered and stored. The user can select which version of LightWave to make active for a given work session by clicking on the appropriate launch icon for the Toaster v3.5 software.

The two Toaster software versions can be safely installed on one hard drive partition, if it is large enough. The v3.5 software requires about 120MB of storage space—v4.2 requires about 450MB. The user would be wise to have 500MB to 1GB to spare on a par-

tition, after the software is installed, to allow for storage of Framestores and images. I usually recommend installation of the two versions on separate partitions, so that large projects are not competing for space on the same drive partition.

What upgrades should a v1.0 or v2.0 user add to their system in order to run the new software? The system should have 2MB of graphics memory, often called "Chip RAM" on the Amiga, and at least 12MB of processor workspace memory, known as "Fast RAM." The software is only supplied on CD, so the user must have a CD-ROM drive and CD filesystem installed.

Now to switch gears a little.

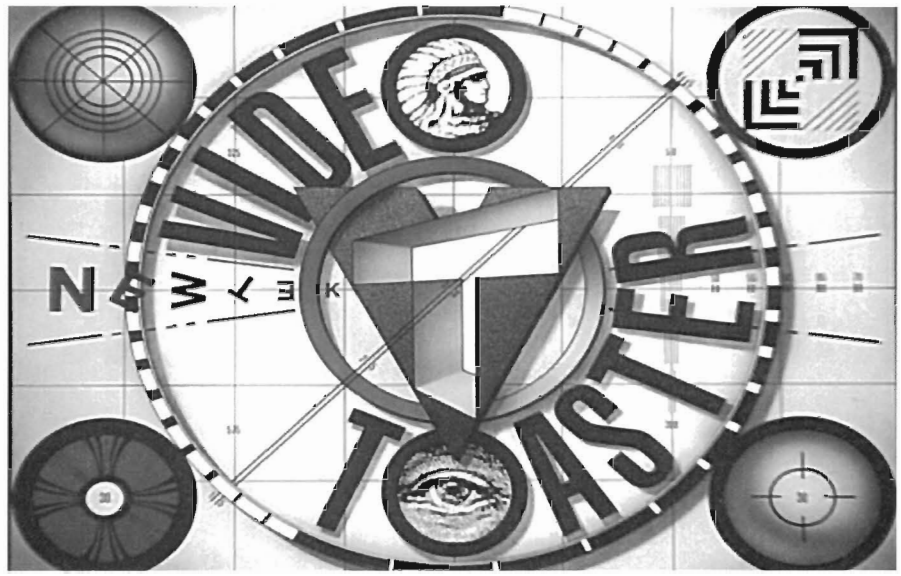
KISSing Techniques

I have been using Amiga computers since they were first introduced. Likewise, I've been using the Video Toaster ever since it was introduced. As an employee in a dealership and then later at NewTek, I have also had lots of opportunity to see how other users put these tools to work. So, what amazing advice would I give on killer Video Toaster techniques?

First, forget killer techniques. The best productions I have done or seen are the ones that stuck to the KISS rule: expressed for a kinder, more gentle world, "Keep It Simple, Sweetie". Most of the time, the best transition to use is a cut or smooth fade. In situations where you want to use more than one transition, try a few from a particular "family," used in alternation. For example, in a wedding video photo montage sequence, use page peels. Nothing else, just the page peels, changing direction each time.

There is enough variety within a group of effects, so as not to wear thin—unless you make the sequence too long. If you use effects in keeping with the theme of the content, the viewer will not be distracted from the material being presented.

More important than anything else is your own eye for creative opportunity. Look at the various elements of your project, and see what can be used to create an emotional experience for the viewer. This concept is most obvious in event videography, such as



weddings and bar mitzvahs, so I will illustrate with some examples of those.

A friend of mine was to edit a one-hour video from the various events of a wedding. The rehearsal dinner had been videotaped by a family member, and the family wanted that footage used. Reviewing the footage, there were of course a few things that should be used. The editor happened to know the family very well, and decided to use footage that would appeal to their sense of humor.

The editing system was set up to play from the source deck, through the Toaster, to the destination recorder. There was a slight problem with noise at the bottom of the video display that could not be eliminated by adjusting tracking. The solution was to frame the footage with a graphic as it went through the Toaster. The sequence was a tremendous hit with the family

On another occasion, the same editor also produced a bar mitzvah video from a two-camera shoot. The cameras were set up on opposite sides of the temple auditorium. One was at the very back and looked straight forward to cover the podium on the left side of the dais. The other was placed further forward, and angled to the right side of the stage.

The camera covering the podium had been set with a wide enough view for those occasions when groups would be at the podium. When a single person was at the podium, there was a lot of blank wall in the middle and to the right side of the shot. How to make things interesting? She noticed, while doing a practice run on the edit, that the footage from the camera on the right had the decorative menorah on the back wall of the dais area centered in frame. She used Soft Circle Out to open a view on the menorah to replace the blank wall and found that, as luck would have it, the menorah was positioned perfectly for this use. That gave her the idea to use it along with some appropriate graphics windowed into the frame to accent the service. Again, her clients were impressed with the creative work.

Creativity can be particularly important when using consumer equipment, especially if you have to figure out how to cover a mistake. I once assisted a friend who was using a Toaster and some consumer decks to edit a wedding video for some relatives. We had managed to sync up the playback of the two tapes from the ceremony, successfully switching the video back and forth between the two machines, and using the audio from the one that had better sound. The problem was that my friend had made an ill-advised movement near the end of the ceremony and accidentally stopped the recording.

What to do? How could we keep from having a visible flaw in the final tape? "Freeze the kiss," I suggested! It took some doing, but the result on the final tape was that the video froze perfectly at the moment of the kiss, a little wedding fanfare played on the audio, the Toaster's Fireworks transition overlayed the freeze and then the ceremony went on, with no visible glitches. Thank heaven for flying erase heads!

Chuck Baker is the director of customer support and services for NewTek, Inc.

Improving Your Amiga's Performance

By Thomas Trenn

Even though the Amiga platform hasn't been updated in years, there are a number of things you can do to improve the performance of your current Amiga. From improved accelerator performance to faster Kickstart ROMs, here's some information that is sure to liven things up on your Amiga.

Optimization for Accelerators

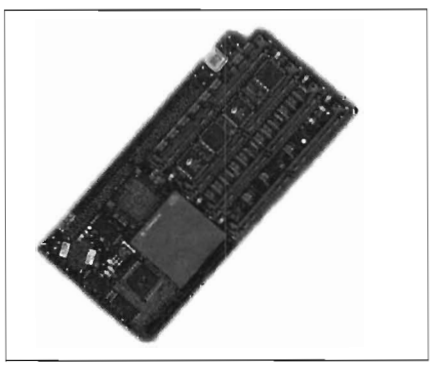
Installing an accelerator is probably the best way to increase the speed of your Amiga applications, but it is not the last. If you already have a 68040/060 accelerator or expect to be getting one, you could possibly make your system even faster.

Many programs that require intensive numeric calculations (such as image processing, raytracing, etc), particularly older ones, are programmed to take advantage of a 68881/82 FPU (math coprocessor) so they will perform operations faster. The problem though, is that 040/060s do not implement all of the functions used by those coprocessors.

When an 040/060 encounters an instruction it does not support, it generates an interruption which causes the Amiga to stop everything it is doing and replace the unknown function call, usually with slow emulation routines within the 68040/060.library in LIBS:. If these interruptions occur often enough, the system can become very slow, which may become apparent by an unresponsive mouse pointer. Fortunately, there are a few solutions to these problems as well as some performance benefits to using them.

Among the various utilities that are available for Phase5 accelerators is a program called CyberPatcher. Starting it is as simple as double clicking its icon or dragging it into your WBStartUp directory and rebooting. Once active, this program watches for illegal processor instructions and replaces the 68040/060.library emulations with more efficient functions, resulting in a faster system and a minimization of sluggish behaviors.

Achim Koyen's (New Generation Software) Oxyron Patcher, more commonly known as OxyPatcher, provides similar functionality to that of CyberPatcher and adds various optimization and configuration options, the ability to monitor its activity, and support for most accelerators. In addition to the main program going in WBStartUp, it is also necessary to run an initialization program from your startup-sequence. When booting, this startup program will install itself in memory and then reset your system. On the test system this added about 20 seconds to the booting process. Like CyberPatcher, illegal instructions are trapped and library emulation routines are replaced with much faster functions. OxyPatcher is commercially available for about $30.



An accelerator can increase the speed of your Amiga applications.

Matthias Henze (Cyberdyne Systems) takes a different approach, which involves replacing the standard math libraries with versions that use only valid 040/060 instructions. Because interruptions are avoided and more efficient routines are used, there can be a drastic improvement in performance. The HSMathLibs are programmed in assembler and available as optimized versions for the 68040 and 68060 to achieve maximum performance. These libraries are shareware

HighSpeed MathLibs

and priced at a very reasonable $7, which includes future updates, downloadable from the support Web site. A special 68881/82 release, for systems without an 040/060, is currently being beta tested and should be available soon.

Many users report that the best results are achieved when using HSMathLibs in combination with OxyPatcher or Cyberpatcher. Why is that? This can be a bit confusing and requires some understanding about how things actually work behind the scenes.

When a program is compiled, various options can be set to force the program to expect a particular CPU (680x0), an FPU (6888x) or to use the Amiga math libraries. This is why you will often see various versions of a program (Clouds_060, Clouds_030, etc.). It is important to note, that if you start a program compiled for an 060 on a system with an 030, the computer will likely crash. Newer CPUs are mostly backwards compatible, though, so you can usually run an 030 or 040 program with an 060.

The Amiga's math libraries were designed to recognize if an FPU is present and if so, to use its faster capabilities. If an FPU is not present the math still has to be done, so functions were included within the libraries themselves to do it. With that in mind, many programs were compiled to use the math libraries, relying on them to determine the faster way to process the calculations. The benefit was that only one version of a program was needed—perhaps, requiring only one disk for distribution instead of two.

The drawback is that it takes time to determine if an FPU exists. Although it is only a very small amount, this increases the time to do a calculation. The HSMathLibs are compiled specifically for each CPU, so some of their faster speed comes from not having to determine what hardware is present. But, be careful, if you try to use the 060 versions of the HSMathLibs on an 030 system, can you guess what will happen? CRASH!

When systems with an FPU became more common, many developers made FPU compiled programs the standard—when fast math was important. These applications use the FPU directly and so are faster than they would be by going through the math libraries. Unless of course, you do not have an FPU in you system.

Now, some programs are available that claim to be compiled specifically for the 040 and/or 060. If programmed properly, these applications should only use valid 040/060 instructions - and should use them directly, resulting in the fastest performance possible. My testing, however, showed that this was not always the case.

I found several programs that claimed to be compiled specifically for the 060, that were still being trapped by OxyPatcher. According to OxyPatcher's documentation, the only time that should happen is when a program uses invalid instructions. So, clearly, something must be amiss.

These days, there is a little of everything out there. So if you combine OxyPatcher or Cyberpatcher with the HSMathLibs, you cover all the possibilities. If a program tries to use an FPU, OxyPatcher steps in and does the job; if the math libraries are accessed, HSMathLibs takes over. In each case, faster performance is the result.

Note that because OxyPatcher and CyberPatcher use the same method of operation, they should not be used together. Each would likely confuse the other and probably send your system spiraling to GURU doom.

See "The Gateway Online" for more details and the results of several speed tests.

Faster Kickstart ROMs

Just about everything your Amiga does, requires access to functions contained within its Kickstart ROMs. Typically, reading these ROMs is much slower than reading from the Fast RAM that can be installed on most accelerators.

Several freely available programs (such as QuickROM and ROM2Fast) take advantage of this fact, as well as the Amiga's ability to relocate its Kickstart into memory.

Nic Wilson's KickSpeed tester reported that Kickstart could be read 3.6 times faster, on our test system, when using ROM2Fast. The QuickROM documentation suggests that, on some systems, results can be even better.

Keep in mind that copying the Kickstart ROM to RAM, means that you will have less memory available for your applications to use. So if you often run out, this might not be such a great advantage. If you have lots of memory, this speed improvement could be a real bonus!

Lower Monitor Power

If you frequented the arcades when you were younger, or still do, you have probably seen the effects of persistent display, often called screen burn-in. This is also commonly seen on monitors used with computerized point-of-sale systems.

If a monitor displays the same thing for long periods of time, that display can become "burnt" into the monitor. Once that happens, even with the monitor turned off you can see a strange, dark, ghost-like image.

The problem was first addressed by using a screen blanker, a program that ran in the background and blacked out your display after a preset period of time, a seemingly reasonable and sensible solution. Somehow, people got it into their heads that screen blankers should display stunning fractal graphics and entertaining cartoons, a concept I have never quite understood.

Environmental and health concerns have become prominent in discussions about computer hardware and issues such as excessive power usage are big topics. The result of which, is that most newer monitors now support DPMS - Display Power Management Signaling. This system allows the computer to tell the monitor to go into a lower level power state, which also means the display is safe from burn-in. Finally, something that makes sense.

If you use CyberGraphX (or something compatible) and have a monitor that supports the DPMS standard, Magnus Holmgren's CGXDPMS will let your computer automatically step the monitor through the DPMS power saving modes: On, Standby, Suspend, and Off, the number of minutes of inactivity to wait before each mode can be set using tooltypes. CGXDPMS is free and a must have commodity.

A Watchful Eye

One of the common difficulties with installing software is that it does not always work the first time you try it. Sometimes the problem is caused by a missing or misplaced library, font, or other necessary file. Unfortunately, most programs assume that everything is where it should be and do not bother to tell you if that is not the case. Many times the program will not start or in worse cases the program causes a system crash.

These problems can be extremely difficult, if at all possible, to track down. But, there is help available. Eddy Carroll's SnoopDos is a must have for every Amiga user. SnoopDos works by installing a patch that monitors various system and AmigaDOS function calls. With SnoopDos on the watch, you will be told what an application is looking for, where it expects to find it and a lot of other possibly important information. Too much information? No need to worry, because SnoopDos can be told what function calls to monitor. SnoopDos is free.

All-In-One

There are literally hundreds of commodities available, each performing some unique system enhancement. Many of these provide very handy functions, so it is not unusual to want several running simultaneously. The inefficiency in this is that each of these utilities require a certain amount of similar program code to make them function as commodities. In many cases, the actual feature that the commodity provides takes up a very small fraction of the program's size.

And so...multi-function commodities were born. This is not a complete solution, because a particular multi-function program may not include all the functions you want. But, it certainly can cut down on wasted memory.

Several of these all-in-one programs are

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available. Among the best is Martin Berndt's MultiCX which currently has more than 50 functions, including: screen and mouse blanking, window and screen cycling, opaque windows, window auto-activation, public screen selection and activation, drive protection, trackdisk.device parameters, popcli, ASCII enter, memory flush, advanced string gadget editing, and much more. MultiCX is available for a shareware fee of US$20.

Cut, Copy and Paste

"Clipboard" is a term that refers to a temporary storage area where text and graphics can be copied or cut (called clips), to be later pasted in another location. Many applications have direct support for a clipboard, but there are many that do not.

Nico François's PowerSnap adds the ability to copy a region of text, displayed with any non-proportional font on any screen or in any window, and then paste it in other applications. Powersnap is free.

Stephan Rupprecht's SGrab will allow you to copy a graphic from an entire screen, a window or a selectable region and save it to the clipboard or to a file. SGrab is giftware.

With these tools, you can clip a website address from a message in your email program and paste it into the URL gadget of your web browser. Or you could grab a section of your workbench screen and paste it into a word processor or DTP program.

One problem though, is that many applications store "clips" in different kinds of clipboards, which other programs do not understand. This means that you cannot always cut/copy from one application and paste into another. Also, you are usually limited to only pasting the last performed cut/copy. The solution to this is Magnus Holmgren's ClipHistory. It provides access to clips from most applications and gives you a pop-up history list to choose from previous clips.

ClipHistory is free.

System Monitors

A system monitor is a tool that allows you to monitor your computer resources. It can tell you detailed information about windows, screens, memory, tasks, CPU usage, ports, assigns, expansion boards, interrupts and more. Some even allow you to perform related actions, for example: halting tasks or closing windows and screens.

One of the earliest of these utilities is Werner Gunther's XOper, which provides information in response to various keyboard commands. If you want something with a gadget interface, more functions and network support, try Richard Korber's Scout. XOper and Scout are free.

Dhomas Trenn is the editor of "The Gateway" section of NewTekniques magazine. He can be reached at TheGateway@youngmonkey.ca.

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Circle #206

Flying High

Back to Tutorials "Creating Foreground Bugs"

By Joe Tracy

Welcome to the first edition of Flying High as part of "The Gateway" section. Because "The Gateway" addition to *NewTekniques* covers questions and answers, plus tips online, my Flying High column can get back ito its original focus—tutorials. So let's get started by teaching you a ToasterPaint, LightWave 3D, and recording technique.

Creating Foreground Bugs

This tutorial will teach you how to create "foreground bugs" (logos) that appear in front of your clips or in front of your LightWave 3D Flyer creations. A foreground bug is the identifier you see on TV stations, that usually appears in the bottom right-hand corner of the screen. Through this tutorial you will learn how to place one over your clips and how to use the Foreground Key option in LightWave 3D to also place it over your animations.

1. Enter ToasterPaint. Here you can create the logo you want to use or import one. For this tutorial, we'll use an older NewTek logo.

2. From the bottom menu, select the Disk button. Next, under the Load menu, select the Brush button. It should open up your Brushes directory. You'll find another directory called Logos. Click on it. Now select "NewTek" an old NewTek logo will load as a brush.

3. Move the brush to the location you want it at and paste it down on the black screen by clicking the left mouse button once. For the purposes of this tutorial, place it in the lower right-hand corner where most station bugs appear.

   Keep in mind that our purpose is to remove the background screen (the black screen in this case) so that the logo shows through to the image or clip in the background. So if your logo was the color black, you'd want to put it on a white background so that we could key out the color white. Unfortunately, the Flyer only allows you to key out the colors white and black.

4. Now that the brush is pasted down, we want to save the entire screen as an RGB image. Select the Disk button on the bottom of the screen. Under the Save menu, select the RGB Image button. Now navigate to your image directory (press Parent to go back one level at a time). Once you are in your Images directory, save the file as "newtekbug" (without the quotes).

   To this point we've taken a brush and have turned it into an image. The purpose of saving the image will be for its use in LightWave 3D. But first we'll quickly detour to use the image over an incoming clip.

5. While still in ToasterPaint, press F10 to render and display the image. Exit

ToasterPaint and return to the Switcher screen. On the Switcher screen, the Main and Preview bars should both currently have the same icon selected (both on DV1 or both on DV2). If they are not on the same one, then change the Preview bar to match the Main bar. The logo you created in ToasterPaint should still be showing on your program monitor.

6. On the Main bar, select Input 1 (if this is where your video feed is coming from).

7. In the bottom right hand corner of the Switcher screen is a SuperImpose area. On the top bar of this SuperImpose area, select the same button that is highlighted on your Preview bar. So if DV2 is highlighted on your Preview bar, then select DV2 in the top bar of the SuperImpose area. In the bottom bar, select the black box. Now move your cursor over the three numbers and hold down the left mouse button. Drag the mouse upwards until all three numbers change to 026.

8. You now have your Switcher perfectly set to impose the NewTek logo over your footage. To see it in action, hit the tilde (~) key to bring up the Abbreviated Record Panel. Next to Source, select Main Out. Now play footage through Input #1 and you should see the logo perfectly reproduced over it! You can now record the footage and the logo will become a permanent part of the clip.

You may find that fine tuning the number in the SuperImpose area (making it a little higher or lower than 026) may better optimize your results.

Now let's switch gears and head into LightWave 3D to apply this same trick to an animation.

9. Exit the Abbreviated Record Panel and open up LightWave 3D. The first thing you want to do is create or load an animation. For this tutorial we'll load one. In the top menu, click on the Scene button. The Scene Panel will open. Click the Load Scene button. A directory with demo scenes will open. Click Demos, which will open another menu. Now find TVGuy.lws and select it. Click OK to load it. Click the Continue button to close the Scene Panel.

10. Hit F9 to render the image. This may take several minutes. You may want to thumb through the rest of the magazine while you wait. Once the image is completely rendered, it will show up on your Program monitor in color. Now you can see what the picture will look like with-

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11. Hit the Esc key to return to the layout screen. From the top menu bar, select Images. The Images Panel will open. Click on the Load Image button. Make sure you are in the Images directory (where you saved the "newtekbug" image). Find "newtekbug" and click on it to highlight it. Click OK. Now click Continue to close the Images Panel.

12. From the top menu, select the Effects button. The Effects Panel will open. Now select the Image Compositing button. The Image Compositing Panel will open. Next to Foreground Image you'll find a scroll-down menu. Access it and highlight "newtekbug." To the left of the words Foreground Key, you will find a small box. Click in it and a checkmark will appear. Leave the Low Clip Color and High Clip Color at 0, 0, 0. You are telling LightWave to put your "newtekbug" image in front of your animation, but to key out the color black. This will, of course, only leave your logo showing over the animation! Click Continue to close the Compositing Panel and click Continue again to close the Effects Panel. Hit F9 to render and display the finished results and you'll see that the NewTek logo is perfectly keyed over your animation.

Problem Solving

If you hit F9 and it only drew out the frame on the computer monitor, but didn't display it on the Program monitor, that is because your Render Display is improperly set. Here's how to set it:

1. From the top menu, click on the Record button. The Record Panel will open.

2. Next to Render Display is a scroll down window. Access it and highlight Video Toaster.

3. Click continue to close the Record Panel.

You're all set. Now your animations will properly render and display. Until next time may the only bugs you have be the ones you create.

Joe Tracy is author of the Flyer Mastery Guide - Version 2.0, which many dealers are now bundling with new Video Toaster Flyer systems. You can order the book from Studio Visions at 1-800-672-1880 or from many dealers and mail order companies, like those that advertise in NewTekniques.

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Circle #209

Insight

A Look at Fragmentation

by Dhomas Trenn

Welcome to the first edition of "Insight." In every issue we will take topical questions and give detailed answers to help create solutions for you. In this issue's column, we will take a deeper look at fragmentation and optimization. If you have any questions you would like to see addressed in this column, please email them to TheGateway@youngmonkey.ca.

What is hard disk fragmentation?

In order to put as much data on a disk as possible, the Amiga file system tries to use even the smallest areas of free storage space. If a file is too large to fit in a particular area, some of it will get saved there and the rest of it somewhere else. So, if you do a lot of file creation, copying, deleting, and overwriting, files will tend to get divided into pieces in order to fill in all the empty spaces. This is called fragmentation.

Why is that a bad thing?

Fragmentation does not corrupt the data in a file in any way—the file system was designed to do this. But, when the computer has to move around to many different places on the hard disk to get all the parts of a file, retrieving that file is slower.

If you keep bread in a cupboard, butter on the counter and meat in the refrigerator, because you have to collect everything first, it takes you longer to make a sandwich than if you had everything in the same place when you started. The same is true of files stored on a disk, though a hard disk is much faster than you are at buttering bread.

Are disk optimization programs safe?

Hard disk optimization programs, file defragmenters or disk organizers as they are sometimes called, can rearrange all the files on a disk so that they require the least amount of time to load. Some of these utilities can also reorganize your hard disk so that icons appear faster in Workbench, directories can be read faster, or various other speed improvements can be made. These procedures can be very time-consuming, however.

There are a couple of concerns that you should be aware of, though. If you use hard drives larger than 4GB, most of these programs, particularly older ones, will not work; regardless of whether you install one of the 4GB fixes.

You should *always* back up your hard disk before using any kind of program that alters the drive contents. If something goes wrong, most often you can't undo what has been done. This is one lesson you don't want to learn from experience.

Since you are going to back up your hard disk anyway, there is another, much faster way to defragment your files. After you have done a backup and a successful compare, quick format the hard disk and then restore your backup. Or, if you can, copy all files from the source drive to another drive, format the source drive, then copy the files back.

Is disk optimization necessary?

Some applications that require speed-critical operations can encounter problems as a result of fragmentation, particularly when working with high quality video and audio. If a program can't read the data as fast as it needs to, the application will fail to perform properly.

Are the Toaster and the Flyer affected?

The Flyer video and audio drives use a custom file system. Unlike with the Amiga file system, individual files are always stored in a continuous sequence of blocks on the hard disk and therefore can never be fragmented.

Some of the Flyer's hard disk storage space can become unusable, however, if files are deleted. The Flyer will not attempt to copy or record files into the spaces where files have been deleted. This is why you will find that space available to record is less than what ReOrg indicates. You can recover the unusable space by performing The Flyer's ReOrg function (not to be confused with the shareware ReOrg program by Holger Kruse), but this is very time-consuming. Many users prefer, whenever possible, to simply copy the files to another drive and then back, as described above. If deleted file(s) are the last files stored on a drive, then the space they are taking up is recovered and can be used immediately.

Since the Toaster does not have its own built-in drive controllers and stores its files on an Amiga system drive, it is susceptible to problems inherent in the Amiga's file system as described above.

Summary

In general use, fragmentation is not a real concern. You are much safer to leave everything the way it is and not risk losing data. If it ain't broke...don't fix it.

Review

Wipes and Effects

Volume 1, Number 1

by Joe Tracy

Alternate Video has released its first of several CDs for Video Toaster and Video Toaster Flyer owners, titled Wipes and Effects, Volume 1, Number 1. The CD contains 85 matte and regular wipes, 30 color wipes, 50 brushes, 35 backgrounds, 30 Toaster Fonts, Bill Evans CWipe conversion program, and Wipe Studio Lite by Dimension Technologies. It works on all 3.x and 4.x Toasters and Flyers.

The cover in the CD case opens to reveal a thank you message for purchasing the CD and suggestions for creating folders to put your effects, brushes, and backgrounds into. I found it much easier to go to the Files/Files view, select my CD on the bottom view, effects tab in the top view, and simply move the folder from the CD titled EFFECTS to the upper window (my effects tab). After a few minutes of copying, I simply renamed the folder, opened it, and examined the effects.

I found the effects on this CD to be average in both quality and execution. A number of them consist of still brushes (like a toy plane) that move from one side of the screen to the other, creating a simplistic wipe. Some of the more creative ones have animation that is very simplistic, like one of a cartoon tiger with his finger giving a "come here" motion as the transition follows the finger. Another effect, not animated except for speed, has a turtle and rabbit going across the screen with the rabbit going faster than the turtle (a race). If you do children's videos, there are several effects that would be appropriate for your production. For high-end productions, I found only one or two that I might use. My favorite was a still shadow of the head of George Washington coming to the middle of the screen and morphing into Abraham Lincoln. A close second is an animated fire effect that crawls up the screen. To get the best results with that effect, I opened up its control panel and changed the effect color to red.

There are also some simplistic wedding wipes. If you do weddings, however, you may want to try Alternate Video's new Wedding Wipes and Effects CD.

Even though the effects are simplistic, they do add a range of extra options for those who do videos that require various effects. There are some things I would have changed, though. For example, one effect has a hand in the middle of the screen with the fingers coming up one by one, counting to five. For me, it would have been more effective if the hand started at five and counted down to one. It would have been a very creative countdown option for the start of some videos.

The brushes are the same as those used in the wipes. I was actually glad to see these included, because they allowed more possibilities. For example, one of the wipes has a thermostat that moves across the screen. I probably would have no reason to use that wipe, but because the thermostat is also included as a brush, it allowed me to use it in a chart as a measurement visual. There's a whole slew of brushes, in a MAX folder, that contain a cartoon-like character in different poses and places. It makes for a good continuing visual and theme for a children's video.

The backgrounds were also average. A number were very distracting (like abstract), that I wouldn't be caught dead using. Others, like the baseball one (with an almost cartoon-like character in a baseball outfit off to the side) are good to build off of for an elementary sports video.

In the fonts category there are 26 Toaster fonts and eight PostScript fonts. The Toaster fonts have fixed sizes that can't be changed, while the PostScript fonts can be made whatever size you desire. It's good for those who like to expand their font collection. I usually have only one or two fonts that I use on a regular basis, however.

The price for the collection is $49.95. That's a hefty price when you consider that you can buy 12 Club Toaster CDs for just a little more than the price of two Wipes and Effects CDs. However, this brings us to a much deeper issue. John Kohn, the CD programmer, spends valuable time creating everything that goes into these CDs. In a letter he enclosed with the CD, he stated, "I have also begun collaboration with four ex-Disney animators who will begin producing animations for me to convert into wipes and effects as soon as I realize an income from the first CD and the Wedding CD." This tells me that the majority of money he receives for these CDs is going back into the CDs to create better releases in the future with higher-quality material. For that reason alone, I would spend the $49.95. It contributes to the survival and growth of the Toaster/Flyer community and third-party product marketplace. Also, the fact that it includes CWipe and Wipe Studio Lite does not hurt! Congratulations, Kohn, on your first release. I look forward to your future work and appreciate your dedication to the community. Wipes and Effects is available through Safe Harbor and Videolink.

Joe Tracy is author of Joe Tracy's Flyer Mastery Guide, available through authorized NewTek dealers and resellers. He is also one of three authors of LightWave 3D Applied, Version 5.6.

Joe Tracy's Flyer Mastery Guide Version 2.0

contains eleven detailed chapters of information, tips, and tutorials that will help you master the Flyer. No matter what level of experience you are at, Joe Tracy's Flyer Mastery Guide is the must own book that is far superior to the manual that ships with the Video Toaster Flyer. Many dealers are even bundling this book with new orders!

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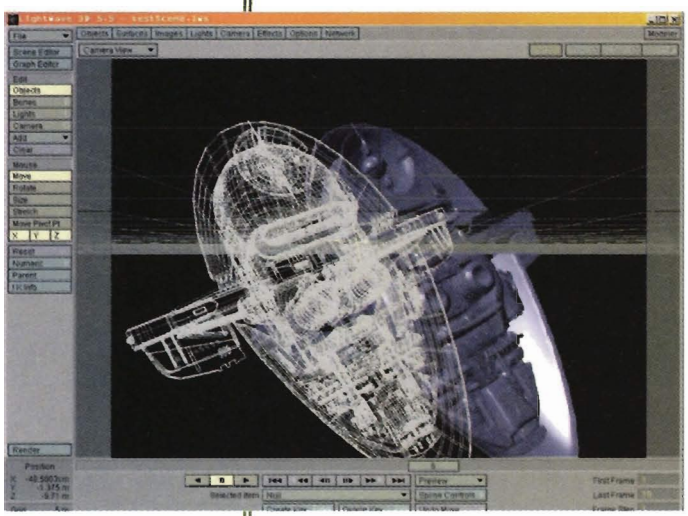

Figure 1a. Wireframe over photographic plate.

By
Wilmer Lin

Mention computer graphics to a diehard LightWave 3D user and they will praise LightWave's excellent facility for lighting. Or they will extol the virtues of Modeler's ease of use and flexibility. Yet very few enthusiasts seem to mention how well Layout also functions for 3D tracking or matchmoving. Last year, *NewTekniques* ran an article on LightWave's involvement in the creation for several shots of *Titanic*; the artists at Digital Domain matchmoved sections of the ship so that virtual "ship extensions" could be created in LightWave and then seamlessly composited over the live action footage.

Many LightWave users have little experience with 3D tracking, or don't even know what it is. This is a brief obstacle course designed to teach the fundamentals of 3D matchmoving to the uninitiated. Though it's not a step-by-step tutorial, we'll try to cover the basics of matchmoving so you can learn this skill on your own.

What Is Tracking, Anyway?

To understand why we track, first you need to understand how working in computer graphics is analogous to filmmaking.

In CG, we build objects in a virtual 3D space. Using Modeler in LightWave, you meticulously add points to an XYZ-coordinate system and then connect them into wireframes. In Layout, these objects look "3D" because the perspective looks correct. The computer does a lot of math to render out a 2D image that appears 3D, with lines converging properly at their vanishing points.

On set, a cinematographer uses a motion picture camera to take 3D actors and put them onto a piece of 2D film. A cameraman has a variety of lenses to alter perspective for dramatic effect. A wide lens lets you capture a lot of depth and squeeze more foreground elements into the picture. A telephoto lens lets you flatten the image while capturing a narrower field of view. Of course, volumes have been written about the effects of lenses, but as long as you have a basic grasp of the concept, that's enough to start matchmoving.

Essentially, 3D matchmoving is taking that virtual camera and a virtual object in Layout and adjusting them so they match

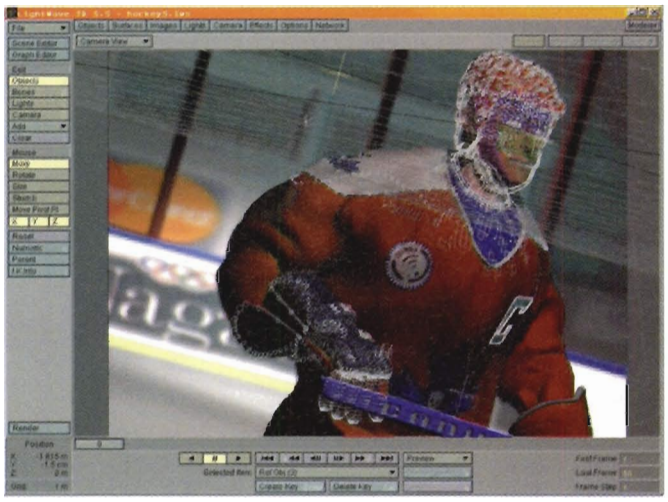

Figure 1b. Wireframe over photographic plate.

exactly what the real camera and real objects are doing on set. The wireframe model fits on top of the photograph like a mask, following it around (Figure 1a and 1b).

A visual effects supervisor is usually present during the live action shoot, and his or her crew is taking notes about the real camera: the size of the lens, its distance to the subject, its angle and direction, the height off the ground, and anything else that might be affecting the shot. Sometimes they might paint in colored targets to help the 3D tracker later. Other times you might be less fortunate and have a piece of film footage that was shot without a visual effects crew. Suppose the filmmaker hadn't planned on using an effect, then decided he needed one afterward. In this case, the only thing you can do is guess and hope for the best.

Either way, matchmoving is a process that relies on the artist's eye for detail. Don't think it's an automated process. Very few things in computer graphics can be done algorithmically. It's a common misconception that since CG artists use computers, the computers somehow do all the artwork: we just plug a few numbers in and out pops this beautiful image! Maybe in a very distant future in a galaxy far, far away that might be the case, but in the world of computer graphics today, matchmoving — like everything else in production — requires a lot of time, work, and patience.

There are several commercial programs available that do have the ability to track in 3D. They let you put your wireframe model over the photographic plate (the live action footage that has been scanned into the computer as a background), then the software does the 3D matchmove. If the object is very simple and rigid, like a box or cube, the program usually works because you have these very tightly defined corners and edges that a computer can "see" very easily. Throw in some tricky lighting and camera movement, however, and the program doesn't always work. It might slip off in certain areas. The point is that there is no automated solution that gets you 100 percent of the way there. It's usually faster to have an experienced matchmover do the work from scratch.

On a recent production, I had the rare privilege/torture of matchmoving live-action footage of animals. Though we had 3D tracking software at our disposal, for all practical purposes it was useless. Once the object on the plate starts deforming, the matchmove software just can't handle it. It's a complex task and requires a human brain to solve.

While matchmoving certainly isn't one of the most glamorous parts of visual effects, it's vital for the production process. When a visual effects house works on a film, every shot typically goes through a "pipeline." Every shot endures a step-by-step, assembly line process of construction. Every job has a slightly different pipeline, but matchmoving usually happens after modeling. Later, the shot goes for animation and lighting and all of the bells and whistles that we typically associate with CG effects. Tracking gets the short shrift more often than not—which is why many new LightWaver users might not have experience with it.

Living in a post-MTV world, however, filmmakers these days tend to use a lot of camera movement. Many visual effects films involve a lot of action sequences, so matchmoving has become increasingly commonplace at companies that produce visual effects. A camera that is not moving is considered "locked off" or "locked down." While it's much easier to do shots with a locked off camera, sometimes it seems out of place depending on the scene. Typically you don't want a visual effects shot to call attention to itself. Visual effects is about blurring the lines of reality, and as

technology has progressed, we are getting closer to the point where effects seamlessly can mix in with live action photography. Matchmoving is another tool for the visual effects artist to do just that.

Suppose you have a background plate of a miniature spaceship or jet plane, then you need to add a nice jet exhaust with Particle Storm. Or maybe you need to add a giant CG snake to an empty room as the camera moves around it. Or perhaps there's a shot with a live-action dog or cat and you have to add a CG jaw to make the animal talk. Depending on the particular camera angle, many of these shots could be done as 2D effects. However, if there's a lot of camera movement, the effect will look a bit off, a little unnatural. Once the shot has been tracked, then it's ready for the LightWave animator and lighter to integrate the effect into the film. Doing the shot in 3D often results in more believable results.

2D Tracking

To boost your confidence, we'll start with a simple 2D tracking exercise. You can either download the sample LightWave scene or make your own. Basically, you are trying to track simple shapes as they move in the x axis and y axis. Play a preview and you'll see a set of moving simple shapes. Each moving shape also has a duplicate without animation data. You need to take the shape without the animation data and move it so it follows the same path as its moving twin.

If you do the exercise correctly, it won't look like you've done anything at all. You can easily check your work by checking the curves for your simple shapes after you're done. Do they match the curves of the original shapes? See Figure 2.

Sample 3D Tracking

Here's another similar exercise. We're still tracking simple shapes. Everything has really well-defined edges and is moving with very simple animation. The difference is that the shapes now have z-depth movement. They appear to pop in and out of the screen. It's not as easy as the last exercise, is it?

You can check this exercise quickly like the last one. You can compare animation curves, or better yet, switch to the ortho views and see if the cubes line up in all dimensions. If they do, then congratulations! You are one step closer to becoming a matchmover. See Figure 3.

Matchmove Obstacle Course

When you really start matchmoving, of course, you won't have the luxury of checking your work by turning on the ortho view. You'll only have a photographic plate to work from and it has to look right. That's the only check.

You can either download the sample movie file or just try the exercises on one of your own

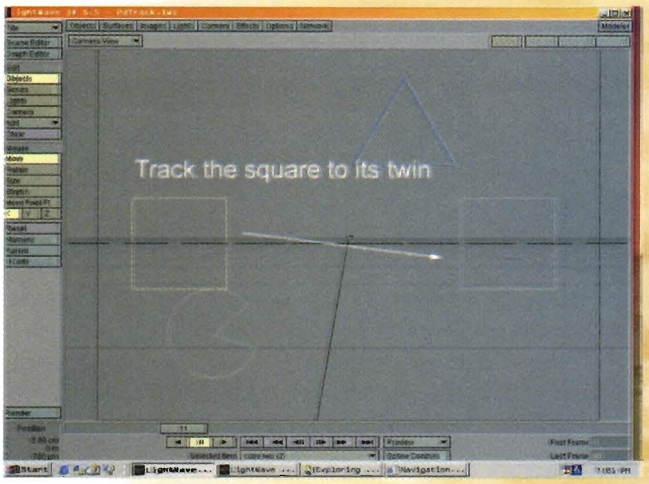

Figure 2. 2D Tracking Exercises.

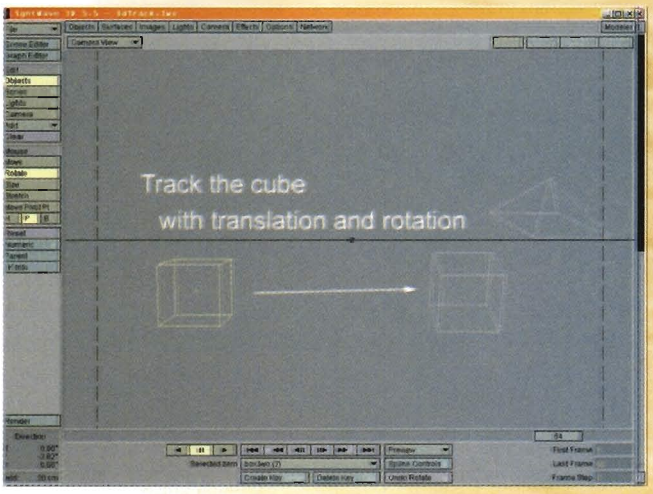

Figure 3. Simple 3D Tracking.

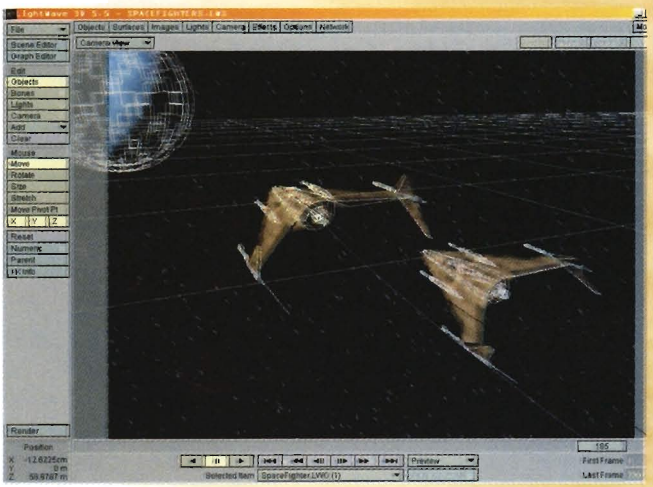

Figure 4. Sample movie file to track.

LightWave scenes. What you need to do is render out the whole sequence and then use the rendered images as the background plate. Import your geometry and try to recreate the animation data by matching the movements of the rendered plate. All of the techniques below should apply. See Figure 4.

Things You Will Need

It always helps to have a really fast computer with lots of memory. It's sad but true. You need to put the photographic plate in the background of Layout, and that takes a big chunk of memory. Even with black and white images, the memory requirements can get pretty steep. While 64MB is adequate, more is better.

If you're going to be shooting your own video or film, you need facilities for importing the video or scanning the film. There are several low to medium cost boards designed to import video into whatever platform you may be using for LightWave.

We've provided a sample scene to download which you can use to practice your matchmove talents. Alternately you could just practice by rendering one of your own scenes and then using your own 3D models to practice matchmoving.

If you don't have enough memory to play back the preview at 30 or 24 fps, you're also going to need some means of previewing at full frame speed. This isn't absolutely necessary but it's another check to see if your track is working. Typically the video boards that let you import video data also export, so you could actually use an NTSC monitor and VCR with good frame control to do the preview.

Modeling a Low Res Model

The first step in the computer is to build an accurate, low resolution model. As always, when you build models, work from detailed photographs (orthogonal view) and good measurements. If your model is not in proportional to the real object in the photograph, odds are that it word track properly. It will slip off in certain areas and not look like it's matching, and no amount of coercion will force it into place.

You want to make sure that the model is low res, because you want your machine operating as quickly as possible. With a high res plate, even the fastest machines can get really bogged down. You really want a simplified "line" model that with few lines can communicate the important part of the model. For instance, if you are tracking an animal, you could a curve that shows you the top of the head, another showing you the back of the head, then the edges of the eyes and the nostrils. You need to find these hard points on the model that don't deform. See Figure 5.

Importing As Background Plate

Now you want to make sure that you import your background plate into the computer. LightWave allows you to use a series of still frames like TGA files as your background in Layout. For this exercise we are using 640x480 resolution images, though commercial work is typically done at much higher resolution. You usually want to work at Academy 1k (1024 x 768) to make sure the final track is accurate enough.

Set Keys

When you first start setting keyframes, you want to focus on the z translation the most. Any kind of z movement quickly changes how the subject looks in the frame. If the z translation is off, it's normally very apparent with growth around the edges. Also, if your tracking in z trans is off, no matter what you do with the other translations and rotations, it won't look like the track is working.

For right now, just work on the first frame and the last frame. Toggle back and forth between them. Does the z translation look like it's matching? If not, go back and make changes. Keep revising these two frames as they will be building blocks for the rest of your track.

Now that you have the z translation nailed, you need to make sure the orientation of the object is correct. Look for hard points on the model: find edges or corners which will make for good reference. Make sure they are points that don't deform! For example, if you were tracking a human head, and the person is talking in the plate, ignore the regions of the mouth; use the edges of the eye sockets, the top of the head and the nostrils, since they don't deform very much. Work from these hard points and make sure that in general the 3D model matches the orientation of the object in the plate.

Start setting keyframes on even frames. Start setting them on 8's (every eight frames). Go through the entire frame range and try to match the size and orientation just on those frames. Toggle back and forth between subsequent key frames and look out for "pops." A pop is a sudden shift in movement that looks unnatural. Many times these show up in your animation curves like an abrupt spike. See Figure 6.

Make sure the edges of the model line up to the corresponding edges in the background. If there aren't any pops on 8's, go down to 4's. Repeat the process. Make sure there aren't any pops. Then go down to 2's. If you've done everything correctly, most of your track should be complete.

The problem you probably have now is some "slipping." Slipping happens when the wireframe is still moving smoothly but is not staying on top of the background properly. Usually you can fix slipping by adding more keyframes. Occasionally you will come across a shot that requires you to keyframe every frame. Either what you are tracking is moving very suddenly or jerking around very rapidly, and you need lots of keyframes to hold the wireframe on top. Most of the time, however, you can get away with keyframes on 2's.

While you are setting keys, periodically you want to evaluate your work by playing back all the

frames with the preview window. You might want to slow down the frame rate, because errors will be more apparent as you playback at half speed. As you get very close to finishing, the preview will look very smooth. It won't look like the object is slipping off. The motion looks clean.

Another thing to bear in mind is to check your animation curves as you work. Make sure they are basically smooth, and there aren't any suspicious places where the curves suddenly spike up. You might have overrotated in one axis, to compensate for a mistake along another axis. This is common because the wireframe has an illusory quality to it. Don't forget to put LightWave in shaded mode and watch a preview or render the sequence with the "solid" object. Sometimes the orientation of your wireframe differs from what you think it might be.

Matchmoving is quite subtle. You are looking for these really small slips and pops that might come back to haunt you later down the production pipeline.

Practice, Practice, Practice

There's no trick to matchmoving really. Conceptually tracking is very easy to comprehend. It just takes some experience to get proficient at it. Even more important than a lot of work and patience is the necessity for getting a good eye. You need to be able to see the difference between a good track and a bad track. The sample movies of tracking errors is not very subtle, but as you learn to matchmove, you'll find yourself getting more sensitive to the very small slips and pops. It might take a few weeks of tracking full time to get competent at it, several months to get really good.

Don't worry if your tracking is taking a lot of time. It is not a fast process and even very experienced matchmovers can spends days or weeks on a shot depending on its length and complexity.

In this demo, we remained with a locked down camera. Many times you will be tracking a moving object shot with a moving camera. In this case, you can either do the camera move first, then finish the track with just the object. Or you could just track the object with brute force to match both the camera movement and the object movement (it really works; just try it).

If you have a deforming object to track, you might need to add bones to the model and use the bones to push or pull points on the model to match the deformations in the plate. This isn't the easiest process in the world, but it really depends on what you're going to do with your shot after tracking.

Now that you have a shot tracked, you can doing more creative things with it. You can start the animation and lighting (the fun part). Then you'll well on your way to doing better and more seamless LightWave effects.

Wilmer Lin is a freelance 3D artist living in Los Angeles. He still has nightmares about tracking pigs, monkeys, and occasionally a pitbull. You can contact him at wilmer@earthlink.net.

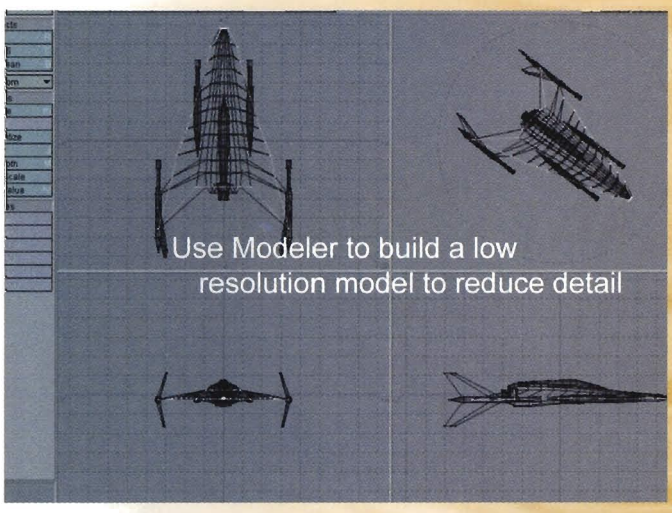

Figure 5. Building a low resolution model.

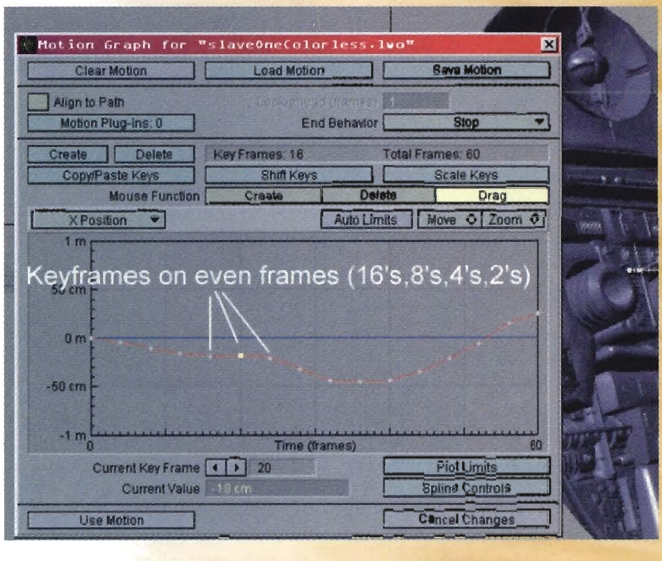

Figure 6. Keyframing even intervals.

Creating Custom Transitions

Creating incredible transitions are simple when you blend Aura and LightWave 3D.

By
Tom Jordan and
William C. Vaughan

Visit any LightWave 3D chat room and one of the most frequently asked questions you'll find is: "How can I use LightWave and Aura together in my work?" Either program is capable of producing awesome special effects, but in this case, one plus one can make three! Here is how you can use LightWave and Aura together to create custom transitions for video, animation, or even a set of still images.

Simply put, a transition is the visual change from one shot to another. Although transitions will not make a poor video great, they can make a great video even better. For the most part, having one shot lead directly into the next is all that is needed. This is called a *cut*. Sometimes your client asks for something to spice-up the transitions. Wipes, dissolves, zooms, and page curls are very common. And that can be a problem when you want a transition to be special. Aura allows you to create some very unique transitions with ease, and with the use of LightWave, it becomes even easier.

We have divided this tutorial into two sections: the Light Wave section, and the Aura section. In order to create the transition effect in Aura we will start by making a matte image sequence in Light Wave. The image sequence will be black and white so that it is easily keyed out in Aura. We will use Hypervoxels to make a bubbly effect for our transition.

LightWave 3D Section

1. First we will create the points object required to get a good smattering of Hypervoxels. Open up Modeler and start by creating a ball (Figure 1) with the following settings:
sides: 40
segments: 20
radii: X=40 cm
Y=40 cm
Z=40 cm

Press Enter to make the ball and then press "K" to kill all of the polygons.

2. What we have now is a sphere of points with no polygons. Press Shift+J to activate the jitter command. In the jitter panel, set the jitter to Gaussian with a radius of 30cm on

all axes and press Enter. The sphere of points now looks like an amorphous wad of points just perfect for what we want. Press the "A" key to center it in all views (Figure 2).

3. In order to see these points in Layout we will convert them to one-point polygons. Go to the Tools tab and click the Custom button and scroll down to the Points2Polys plug-in. Now that our points are polygons, save the object out as points.lwo.

4. Now let's move over to Layout. Launch Layout and load up the points.lwo object. In order to better see the points, go to the Scene Editor, and under the Show tab select Show All Objects as Points Only. Then click the small dot next to the word *points* twice to have them show up in layout as a green color.

5. Next, orient the camera so that the render area is full of dots and create a keyframe (Figure 3). Select the points object and open the Objects panel. Under the Displacement Map Plug-in menu select the LW_Hypervoxel Particles plug-in.

6. In order to see the particles we have created as Hypervoxels, we must first scroll the frame scroller at the bottom of the Layout interface at least one frame. This will update the information in Layout and allow us to proceed with Hypervoxels.

7. Go to the Effects panel, select the Image Processing tab, and under the Pixel Filter Plug-ins select LW_Hypervoxels. On the next tab select LW_Hypervoxels Doubler.

8. Open up the Hypervoxels options panel and click the Enable Hypervoxels button and the Render 1/2 res button. The Render 1/2 res button will maximize our use of the Hypervoxels Doubler. On the object list, select the points object and click Activate.

9. Press the refresh button to get a preview. There should be some red globs in the preview window. In order to achieve the desired effect, the image sequence we are making will have to be black and white so that the transition is easily keyed out in

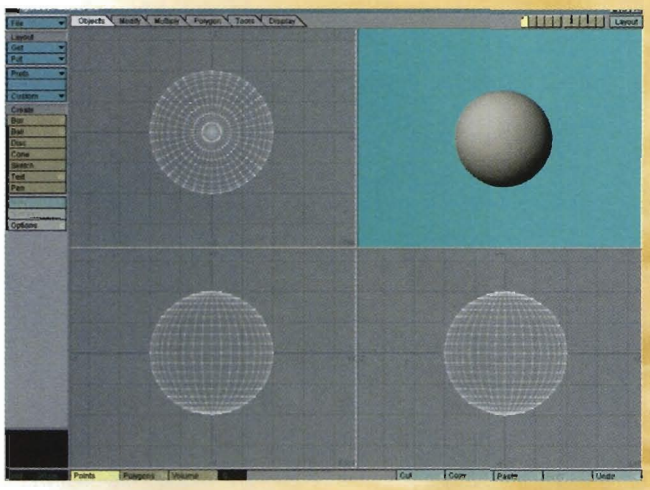

Figure 1

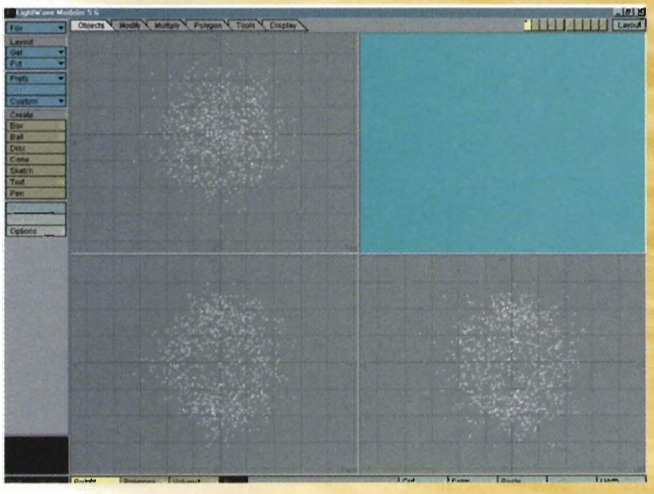

Figure 2

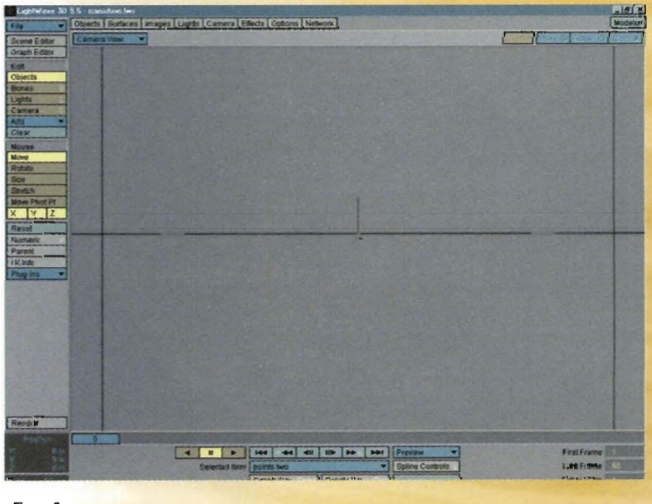

Figure 3

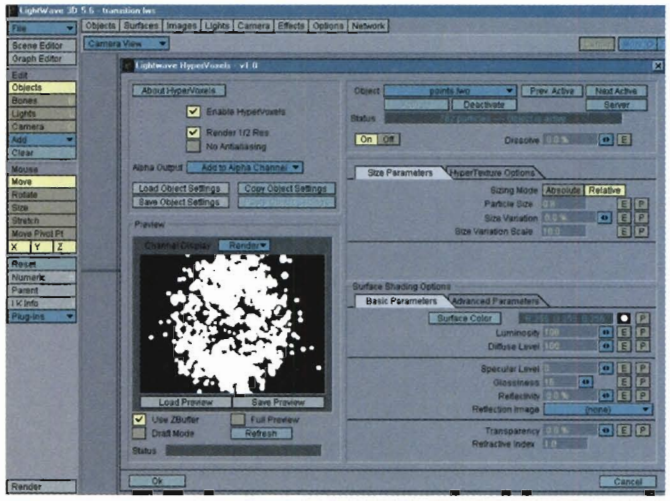

Figure 4

Aura.

10. The following settings will give our Hypervoxels a flat white color with no shading—ideal for Aura (Figure 4).

    Surface Color: 255 255 255
    Luminosity: 100
    Diffuse: 100
    Specular Level: 0
    Glossiness: 16
    Reflectivity: 0
    Transparency: 0

11. We are now ready to animate the Hypervoxels. First set the Sizing Mode to Absolute and set the Particle Size to zero, this will ensure that the Hypervoxels follow the keyframes we give them. Now click the envelope button next to particle size. We are going to create an envelope for the particles so that they appear to grow from nothing to very large.

12. In the Particle Size envelope create a key at 19 and make its value .4. Now the Hypervoxels will grow and fill the screen with white by frame 19. Also set the *tension* for the key at 0 to 1.0 to add some anticipation to our envelope (Figure 5). Click OK to exit the envelope and OK to exit Hypervoxels.

13. You can now save your scene and prepare to render the sequence. Don't forget to dissolve the points object 100% before rendering, otherwise you may see points in your Hypervoxels. For this example we will render at 320x240 with AA set to Enhanced Low. Make sure that you render individual frames instead of an .avi or .mov for maximum Aura compatibility.

Once the frames are rendered you are ready to jump into Aura and create your transition.

Aura Section

1. Now that you have your black and white images from LightWave, let's bring them into Aura and use them to create the transition. Launch Aura. Select the configuration you prefer, then choose the VGA Hires and page size of 320 x 240. Click the OK button.

2. This tutorial will take full advantage of Aura's layering options. Click on the Layers button to open the Layers Control Menu. For this tutorial you will need three still images. The ones used here are titled Revenge001, Revenge002, and Revenge003. These images can be found in the bonus section of the *NewTekniques* web site. "www.newtekniques.com/bonus". This technique can work with still images as well as animation and video.

3. Import the image files as separate images. (File/Import/Image). Each image should appear on its own layer. This will be necessary to have one image transition into another.

4. After you have the still images in Aura, import the black and white images as a sequence. (File/Import/Sequence). This will open up the Loading Sequence window. You can use the slider to scrub through the frames. This window also gives you information about the image sequence before you import it into your file. See Figure 6. There should be nineteen images. Click OK to import.

5. What we need to do now is organize the layers. We will not need the untitled layer, so you can delete it from the list. Select the untitled layer and choose Delete Layer from the Layer list.

6. Starting from the top of the layer menu, organize the layers in this order:

    BW
    Revenge001
    Revenge002
    Revenge003

7. From the Layer Menu Options, located at the top of the layer control panel change the global time-line scale to 1/10. This will shrink the time-line and give you more room to move around. From this drop down, you can also change the size of your layer icons. Medium icons should be okay. Your Layer control menu should look like Figure 7.

8. Once you have the layers in order, stretch the three

Revenge Layers out to frame 80 by pulling on the white tab at the end of each strip. This will display the still images over several frames. Using a still image over several frames can cut down rendering time in LightWave for logo animations.

9. Click on the center part of the icon strip in the Revenge002 layer and drag it until the first frame starts at frame 60. This will offset the Revenge002 image from the Revenge001 image, leaving 20 overlapping frames.

10. Click on the center part of the icon strip of the Revenge003 layer and drag it until the first frame starts at 120. This will offset the Revenge003 image from the Revenge002 image leaving 20 overlapping frames. Your Layer control menu should look like Figure 8.

11. Click on the BW layer icon to make it active. Move to frame five in the timeline, right-click on the BW frames and choose select all. Frame five should have an even amount of black and white shapes. This will be helpful in the next step.

12. What we want to do now is knock out all of the black from the BW layer. From the filters menu choose olor/Key/Key:color. This brings up the Color Key Window. See Figure 9. Keep the color set to black, and change the Range and Fade to 20. Make sure that all the frames are selected in the BW layer and click Apply to Layer. The black in the BW layer should be removed and you should now be able to see through to Revenge001. See Figure 10.

13. In this example we will need two transitions for the three images: one for Revenge001 to Revenge002, and one for Revenge002 to Revenge003, so duplicate the BW layer by choosing Duplicate from the BW layer list. Name the layer BW2 and click OK.

14. Drag the BW2 icon strip so that it covers the overlapping frames of Revenge001 and Revenge002. The last frame of BW2 should be on frame 80.

15. Drag the BW icon strip so that it covers the overlapping frames of Revenge002 and Revenge003. The last frame of BW should be on 120. Your Layer control menu should look like Figure 11. Now would be a good time to save your work.

16. From the main panel, change the drawing mode to Erase. Drag the BW2 layer icon onto the Revenge001 layer icon. This should merge the

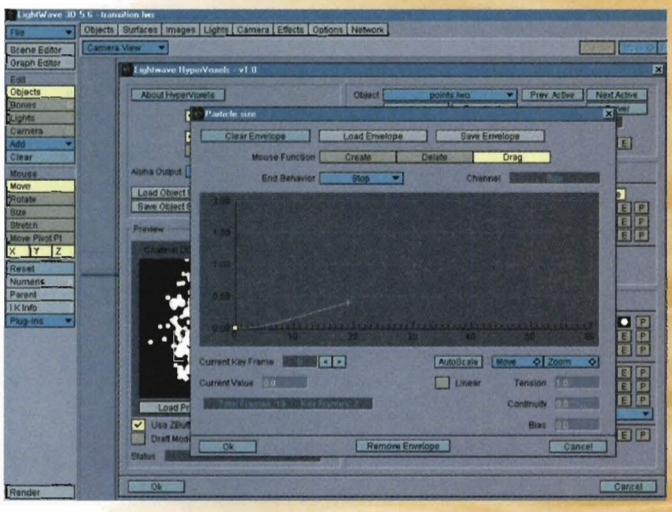

Figure 5

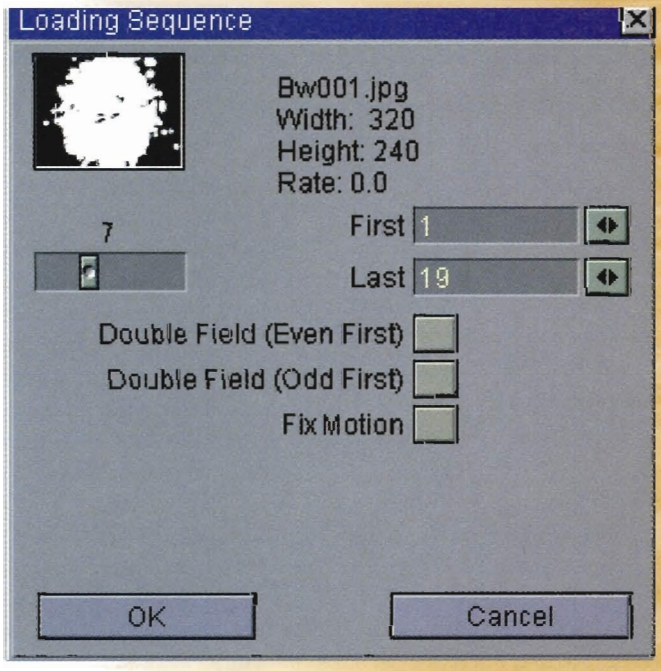

Figure 6

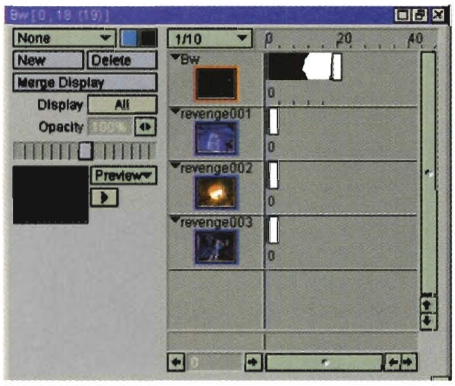

Figure 7

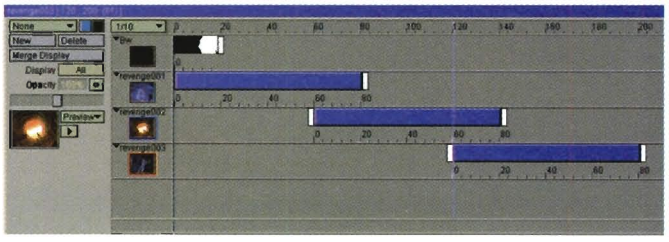

Figure 8

two layers and erase the white shapes from Revenge001.

17. Now drag the BW layer icon onto the Revenge002 layer icon. This should merge the two layers and erase the white shapes from Revenge002.

18. To see what you've just done, hide BW2 and BW by choosing hide from the Layers list and select Make from the Preview drop down. You should now see the first image breaking up and revealing the second image, and then the second image revealing the third. See Figure 12.

This is just one example of an endless variety of transitions that can be created with LightWave and Aura. So now that you know the secret, don't stop at organic shapes. Try using recognizable silhouettes, like human figures (James Bond intros), text, or any other interesting shape. For Aura users who don't use LightWave, you can create the matte image sequence inside Aura by painting the individual frames. If you create it in Aura, just use white without a black background and you can skip the color key step. The best thing about the custom transitions is that you can build up a large library of matte images that can give your work the "edge" needed to make it stand out.

Figure 9

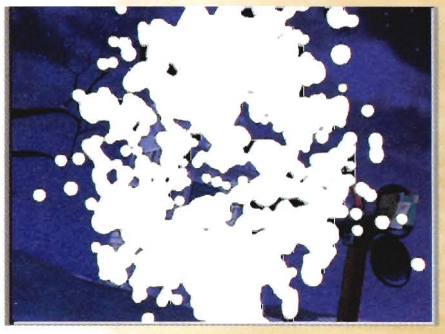

Figure 10

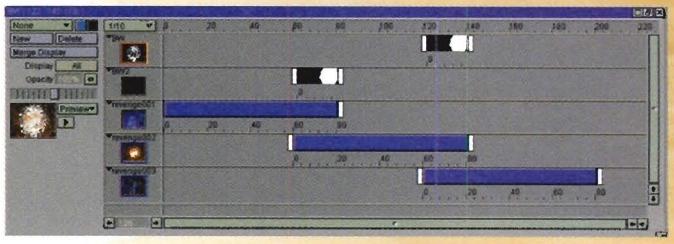

Figure 11

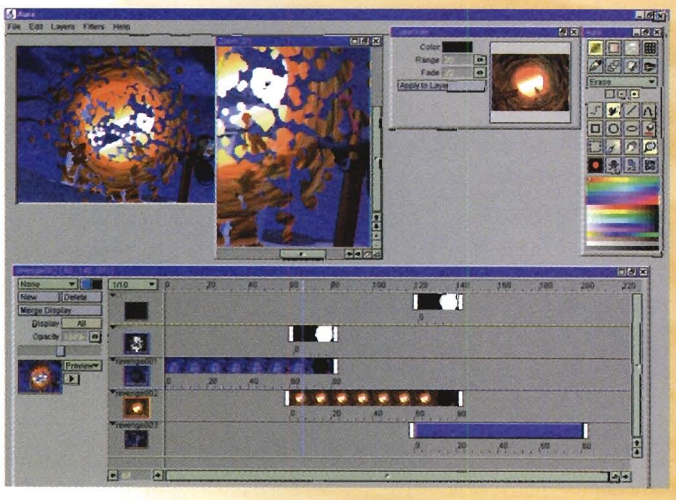

Figure 12

Continued from page 19

Close the panel by clicking on Apply. Deactivate [/] the polygons and Size To Fit [a].

We want our UFO to have lights that run around the edges of the saucer so we need to make cutouts in the side of the UFO for this. As you already know Phased Coil based Plasma Drive Emitters require a symmetrical Induction array, so lets make one.

8. Select all the polys along the edge in the Face View with the selection shown in Figure 6. To make this part of the modeling easier to see lets Hide The UnSelected Polygons [=]. If you switch back to the Orthographic View and Size To Fit [a] the visible polys on your screen should look like Figure 7. Now we have to perform the tedious task of deselecting every other polygon until our view looks like Figure 8.

9. Bevel [b] the selected polygons with these values:

Inset : 10cm
Shift : 0m

This creates a nice border around the selected polygons. Next we need to inset our polygons to create the emitter arrays. This is done with Smooth Shift [Shift – f] with the following values :

Offset: -50cm
Max Smoothing Angle : 89.5

If all went well your screen should look like Figure 9. After verifying your work bring back the rest of the model from hiding by Showing All [\ ].

10. With the edge polygons still selected, open the Change Surface Panel [q]

Surface: TowTruckUFO_UpperInsideGlow
Color: R: 77
G: 72
B: 242
Diffuse: 100%
Specular: 0%
Glossiness: 64
Smooth: Off

Close the panel by clicking on Apply. Deactivate [/] the polygons and Size To Fit [a].

11. Let's do a little of the same cleanup on the bottom as we did on the top. Using the Lasso Select | Right Mouse Button | activate the first underside flat ring as shown in Figure 10. Make another Lasso Selection [Right Mouse Button] but this time activate Add To Selection [Shift Key] and add the polygons shown in Figure 11. You should now have 144 polygons selected. If this is correct, Merge [Shift – z] them into just two polygons. Once Merged you can Hide Selected [-] since we won't be needing them for a bit.

12. To finish off the changes we will make to the Saucer body itself we need to add more vent work to the underside. Select the polygons as shown in Figure 12. Next deselect the slices so that they are grouped in twos; two active then two not, around the saucer. It makes it easier if you Size To Selection [Shift – a]. When you are done your selection should look like Figure 13.

13. We'll push these panels back the same way we did the other grooves with Smooth Shift [Shift – f] at the following settings:

Offset: -50cm
Max Smoothing Angle: 89.5

Apply the following surface to the active polygons in the Change Surface Panel [q] :

Surface:TowTruckUFO_LowerInsideGlow
Color: R: 77
G: 72
B: 242
Diffuse: 100%
Specular: 0%
Glossiness: 64
Smooth: Off

This can be accomplished by changing the "Upper" to "Lower" in the surface name and clicking Apply.

If you Unhide All [\ ] the hidden geometry, our UFO should look like Figure 14. Save [s] the object since it would be a shame to not save such an amazing accomplishment. You've got to start somewhere, after all.

Next time we will be adding some nurnies to add more detail. We will also be creating the moving parts and begin to put them all together in Layout.

Homework:

Play around with adding more detail through the addition of simple shapes to the underside of the craft. Keep in mind that in the final shot we will be using shadow and highlight to imply more detail than is actually there.

Scott Wheeler is one of three authors of LightWave 3D Applied, available in bookstores and online.

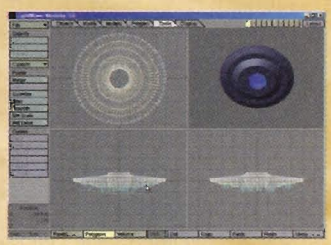

Figure 11

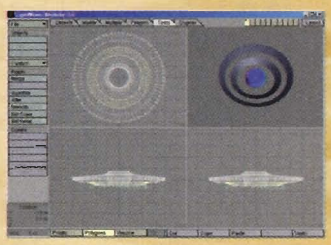

Figure 12

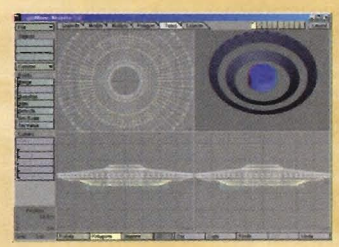

Figure 13

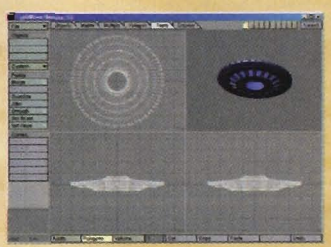

Figure 14

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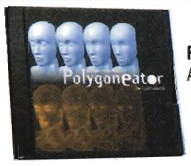

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also available in Betacam or DV-CAM packages, call for prices.

DSR-200A 3-CCD Digital (DVCAM) Camcorder

Combining a compact and lightweight body with the superior picture quality of DSP (Digital Signal Processing) and the DVCAM format, the DSR-200A is the ideal acquisition tool for video journalists, event and wedding videographers, stringers and production houses. 500 lines of horizontal resolution, 48kHz or 32kHz digital audio, three hour record time, and minimum illumination of 3 lux is only the beginning. Other features include 16:9/4:3 capability, Steady Shot, high resolution 1-inch viewfinder, time code operation, time/date superimposition and an IEEE-1394 interface for direct digital output. Offers full automatic as well as manual control of focus, iris, gain, white balance and shutter speed.

- Variable servo 10X optical power zoom lens goes from 5.9 to 59mm in 1.7 to 24 seconds. The manual zoom rocker is continuously variable right up to where the digital 20X zoom kicks in.
- Sony's Super Steady Shot reduces high frequency camera shake without compromising image quality. SteadyShot uses horizontal and vertical motion sensors that allow it to work accurately while zooming, moving (even shooting from a car), and shooting in low light conditions.
- Has digital effects including audio and video fade, overlap and Slow Shutter.
- Automatic and manual focus, iris, shutter, gain and white balance. Iris is adjustable in 12 levels from F1.6 to F11, shutter from 1/4 to 1/10,000 of a second in 12 steps, Gain from -3dB to +18dB in 8 steps.
- Zebra Pattern indicator, built-in ND filter.
- Custom Preset function lets you preset, store and recall custom settings for color intensity, white balance (bluish or reddish), sharpness and brightness.
- Stores Photo, Date/Time, Shutter Speed, Iris, Gain and F-stop for easy recall. So if you have to re-shoot, you know your original settings for every scene and frame.
- Records Drop/Non-Drop Frame time code. Time code can be read either as RC time code or as SMPTE time code
- Has a large 1-inch B&W viewfinder with 550 lines of resolution for easy focusing even in low contrast lighting situations. Separate information sub panel displays time code, battery time, tape remaining and other camcorder functions without cluttering up the viewfinder.
- Records 16-bit/48kHz audio on one stereo track or 12-bit/32kHz with two pairs of stereo tracks (L1/R 1, L2/R2), so you can add stereo music or narration.
- One-point stereo electret condenser mic for clear stereo separation. Directivity can be selected from 0°, 90° & 120°.
- Automatic & manual (20-step) audio level record controls. Monitor audio with headphones or from the LCD panel which has an active VU meter.
- XLR input connectors for mics and audio equipment.

DSR-200A Field Package:
- DSR-200A Camcorder • NPA-1000/B Battery Case Adapter
- 3 NP-F930/B 7.2v 4000 mAH Batteries
- AC-V900/B AC Adapter, Triple Battery Charger
- VCT-U14 Tripod Adapter • LC-2000CP System Case

DSR-20 DVCAM Player/Recorder

The DSR-20 is a versatile DVCAM VCR with a very compact chassis and a variety of convenient functions for recording, playback and simple editing. It features auto repeat playback, power-on recording/playback, multiple machine control interfaces, AC/DC capability and i.Link (IEEE1394) input and output. And of course, it offers the stunning image and sound quality inherent to the DVCAM format.

DVCAM Quality
- Utilizing the DVCAM format, the DSR-V10 provides the recording/playback quality and reliability required for professional use. It can also play back consumer DV format tapes without any special adapter.
- Provides two selectable audio modes: a two channel mode with 48 kHz/16-bit recording and a four channel mode with 32 kHz/12-bit recording.
- Dual-size cassette mechanism accepts both mini size (up to 40 minutes) and standard size DVCAM tapes (up to 184 minutes) without an adapter.

Editing Capability
- Equipped with Control L interface, the DSR-20 can perform simple time code-based editing when connected to another DSR-20 or other similarly equipped VCRs/cameras like the DSR-30, DSR-200A or DSR-PD1. When using the FXE-120 or ES-3 EditStation System, the DSR-20 can serve as a feeder player.
- Has DV (IEEE1394) input and output. When connected to other DV equipped machines, the DSR-20 offers digital dubbing of video, audio and data, without any deterioration of image and sound quality. In addition, in the "Digital dubbing including TC copy" mode, full information of video, audio and time code of the original tape can be copied to another tape. Especially useful when making working copies of the original.

Record/Playback Functions
- Automatic repeat function for repeated playback. After reaching either the end of the tape, the first blank portion or the first index point, the DSR-20 automatically rewinds the tape then starts playing back the segment again.
- Power-on recording/playback capability for unattended automatic VCR operation. When connected to an external timer and the VCR's TIMER switch is set to REC, the DSR-20 starts recording as soon as power is turned on. Likewise, when the TIMER is set to REPEAT, the VCR goes into Auto Repeat mode and starts playing back the moment power is turned on.
- In addition to Control L, the DSR-20 also incorporates a Control S and RS-232 interface for remote control operation. Basic VCR functions can be controlled from a PC via RS-232, while Control S allows control via the optional DSRM-10 Remote Control. In addition, with the Control S input/output connector, two or more (up to 50) DSR-20's can be daisy-chained and controlled from one DSRM-10 Remote Control.
- External sync input enables synchronized playback with other VCRs. Especially important in A/B roll configurations.

Conveniences
- The DSR-20 be powered by AC or DC. Ideal for mobile applications, the DSR-20 can be connected to a 12V power supply like a car battery or battery belt & powered via the 4-pin XLR DC input.
- Can perform searches for Index Points, which are recorded on the tape as "in-point" marks everytime a recording starts. The DSR-20 can also search for photo data recorded on a DVCAM cassette by the DSR-PD100/200A/300, or where the recording date has been changed.
- Supplied with the RMT-DS20 Wireless Remote for control of basic VCR functions. And again, when two or more VCRs are connected via Control S, they can be simultaneously controlled from one wireless remote by simply sending one command to the master deck.

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QUICK DIAL 72

SONY

UVW-1400A Betacam SP Recorder

The UVW-1400A is a non-editing VCR which deliver Betacam SP quality and offer features for a wide range of playback and recording applications. RGB and RS-232 interface make it especially ideal for large screen, high quality video presentation, scientific research and digital video environments.

- Ideally suited for work in computer environments, because RGB signals can be converted into component signals and vice versa with minimum picture degradation.
- 25-pin serial interface allows external computer control of all VCR functions based on time code information. Baud rate can be selected from between 1200 to 38,400 bps.
- Built-in Time Base Stabilizer locks sync and subcarrier to an external reference signal as well as provides stable pictures.
- Built-in LTC Time Code and UB (User Bits).reader/generator
- Equipped with two longitudinal audio channels.
- Auto repeat of entire or a specific portion of the tape.
- Built-in character generator can display VTR status, time code, self-diagnostic messages, set-up menu, etc.

- Control of jog, shuttle, playback, record, pause, FF and REW with the optional SVRM-100A Remote Control Unit.
- Composite and S-Video as well as component via BNCs which are switchable to RGB output. The UVW-1400A has two switchable sync connectors and a Sync on Green.
- Built-in diagnostic function and hour meter.
- Initial set-up menu for presetting operational parameters.

UVW-1700G

Betacam SP Computer Graphics Frame Recorder

The UVW-1700G has all the features of the UVW-1400A (except foot switch control) plus it adds frame accurate video insert editing capability as well as RS-232 and RS-422 interfaces. These make the UVW-1700G ideal not only for conventional video program production but also for animation and computer graphics creation.

Same features as the UVW-1400A *PLUS*—
Uniquely equipped with both RS-232 and RS-422 serial ports for versatile system integration. Both serial ports are easily accessed via the set-up menu. Built-in time code capability combined with sophisticated servo servo system ensures frame accurate insert editing (video only) when connected to computer-based editing systems (via RS-232 port) or RS-422 equipped edit controllers. Ideal VCR for animation and computer graphics creation, where frame-by-frame editing is indispensable.

UVW-1800 Betacam SP Editing Recorder

All the features of the 1400A *PLUS*—

- Optional UVR-60 allows remote TBC adjustment.
- RS-422 interface for editing system expansion.
- Two types of component output; via three BNC connectors or a Betacam 12-pin dub connector.
- Frame accurate editing is assured, thanks to sophisticated servo control and built-in time code operation. In the insert mode of the UVW-1800, video, audio Ch-1/2 and time code can be inserted independently or in any combination.

PVM-14M2U/14M4U & 20M2U/20M4U

13-inch and 19-inch Production Monitors

Sony's best production monitors ever, the PVM-M Series provide stunning picture quality, ease of use and a range of optional functions. They are identical except that the "M4" models incorporate Sony's state-of-the-art **HR Trinitron** CRT display technology and have SMPTE C phosphours instead of P22.

- HR Trinitron CRT enables the PVM-14M4U and 20M4U to display an incredible 800 lines of horizontal resolution. The PVM-14M2U and 20M2U offer 600 lines of resolution. M4 models also use SMPTE C phosphours for the most critical evaluation of any color subject.
- Dark tint for a higher contrast ratio (black to white) and crisper, sharper looking edges.
- Each has two composite, S-Video and component input (R-Y/B-Y, analog RGB).For more accurate color reproduction, the component level can be adjusted according to the input system. Optional BKM-101C (video) and BKM-102 (audio) for SMPTE 259M serial digital input.
- Beam Current Feadback Circuit
- 4:3/16:9 switchable aspect ratio.
- True multi-system monitors they handle four color system signals: NTSC, NTSC 4.43, PAL, and SECAM.
- External sync input and outputcan be set so that it will automatically switch according to the input selected.
- Switchable color temp: 6500K (broadcast), 9300K (pleasing picture), User preset.(3200K to 10000K).
- Blue gun, underscan and H/V delay capability
- On-screen menus for monitor adjustment/operation.
- Parallel remote control and Tally via 20-pin connector.

QUICK DIAL 731

CTI DISK ARRAYS for Mac and Windows NT

Using PCI Ultra SCSI accelerator cards and Seagate Ultra SCSI 16-bit hard drives, CTI disk arrays provide high data of up to 80 MB/sec to ensure smooth clean video without dropped frames. Especially designed for audio and video applications, Seagate disk drives employ embedded servo technology, eliminating the need for thermal recalibration. CTI disk arrays are fully tested for Windows NT and Power Macintosh systems and are available in fixed and removable configurations. With arrays from 8GB to 72GB and up to 180GB when daisy chained, CTI delivers the flexibility, performance and reliability at a price you can afford.

• Plug and Play • Hot swappable cannister (on removable only) • Multiple large power supplies • Efficient cooling and airflow • RAID striping software for Windows NT or Macintosh • 68-pin active terminators and 68-pin system cables • Push button SCSI ID selector • All arrays come with a **Five Year Limited Warranty**

2 Bay Tower Fixed

CTI-8FS 8.4GB Array with 2 Seagate Barracuda 4.2GB Ultra Wide drives (#ST34572W) and Single Channel SCSI card (18.2 MB/s sustained transfer rate) **999.00**

CTI-18FS 18.2GB Array with 2 Seagate Barracuda 9.1GB Ultra Wide drives (#ST39173W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate) **1649.00**

CTI-36F2S 36.4GB Array with 2 Seagate Barracuda 18.2GB Ultra Wide drives (#ST118273W) and 2 Single Channel SCSI cards (28.2 MB/s sustained transfer rate) **2549.00**

2 Bay Tower Removable

CTI-18RS 18.2GB Array with 2 Seagate Barracuda 9.1GB Ultra Wide drives (#ST39173W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate) **2079.00**

CTI-18RO Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate) **2649.00**

CTI-36R2S 36.4GB Array with 2 Seagate Barracuda 18.2GB Ultra Wide drives (#ST118273W) and 2 Single Channel SCSI cards (28.2 MB/s sustained transfer rate)..... **2999.00**

CTI-36RD Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate) **3519.00**

4 Bay Tower Removable

CTI-36RS 36.4 GB Array with 4 Seagate Barracuda 9.1GB Ultra Wide drives ((#ST39173W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate) **3829.00**

CTI-36RO Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate) **4423.00**

CTI-36R2S Same as above with 2 Single Channel SCSI card (46.4 MB/s sustained transfer rate) **4199.00**

4 Bay Tower Removable

CTI-72RS 72.8 GB Array with 4 Seagate Barracuda 18.2 GB Ultra Wide drives (#ST118273W) and Single Channel SCSI card (28.2 MB/s sustained transfer rate) **5623.00**

CTI-72RD Same as above with Dual Channel SCSI card (39.9 MB/s sustained transfer rate) **6159.00**

CTI-72R2S Same as above with 2 Single Channel SCSI card (46.4 MB/s sustained transfer rate) **5999.00**

QUICK DIAL 732

NEWTEK

LIGHTWAVE 3D 5.5

3D Rendering and Animation Software for Broadcast Graphics

LightWave 3D is the easy way to create the most sophisticated 3D animation imaginable. It's intuitive, complete, easy-to-use layout and modeling system deliver the ultimate in creative control, not to mention flexibility. Unparalleled features for modeling, surfacing, lighting and animating are right at your fingertips. Raytracing, motion blur, MetaMation, inverse kinematics (IK), Bones, field rendering, lens flares, compositing - they're all here. And with OpenGL and Quickdraw 3D support you can see your creations in real time. Add a robust plug-in architecture, and it's no wonder you find LightWave 3D in more Hollywood animation suites than any other 3D program. LightWave 3D is available for almost platforms: Windows 95, Windows NT, Power Mac, DEC Alpha, SGI and Sun Microsystems.

LightWave 3D 5.5		Upgrades from LW 5.0 to 5.5		Upgrades from LW 4.0 to 5.5	
For PC (Intel)	1599.00	From Intel 5.0	449.00	From Intel 4.0	599.00
For PC (DEC Alpha)	1599.00	From DEC Alpha 5.0	449.00	From DEC Alpha 4.0	599.00
For Macintosh	1699.00	From Macintosh 5.0	549.00		
For SGI	2499.00	From SGI 5.0	899.00		

INSPIRE 3D

3D Art and Animation Software for Graphic Artists, Multimedia Developers and Web Designers (For Mac or PC)

Specifically designed to meet the demand of the graphics pro, Inspire 3D is a powerful program that lets you add a whole new dimension to your work by creating stunning print images, dynamic multimedia productions and slick web visuals that just aren't possible in 2D. With Inspire 3D, you can model, animate and render 3D elements in any style and complexity. By adding texture, motion, lighting effects and more, your print materials will almost pop off the page. Use the images you create as single frame print graphics or as lower resolution animation files for multimedia or the web or choose from a library of pre-created images. And use the photorealistic or stylized animation images you create for real-time graphics applications, including VRML 2.0, for all kinds of projects.

- Compatible with Photoshop, QuarkXPress, Illustrator, Freehand, Director, and more. Create simple or complex animations, transform Illustrator files into animated 3D graphics, create killer photorealistic 3D or cartoon-style images and use pre-created or custom modeling.
- Supports 16 image and seven 3D model formats, gives you your choice of output with resolutions up to 8,000 x 8,000.
- Expandable modeling capabilities and a ton of plug-ins for specialized functions. Features like Spline-based modeling and MetaNURBs let you mold and manipulate objects in ways you never could before, then output them as hi-res images - fast. Use Insprire's library of designer images, create your own - or mix the two for interactive content, games, training materials and movies.
- Quickly and easily create brilliant single and composite images and animations to design exciting web sites.
- Uses LightWave 3D's formidable rendering engine to put true photorealistic capabilities right on your desktop. Gives your 3D images the edge you're looking for.
- Revolutionary modeler lets you create any shape or form you dream up just by clicking on a few points. Then reshape, subdivide, clone, modify, reposition and control any object in 24-bit color and view it in real-time.
- Compositing capabilities let you to build sophisticated, layered images for print or animation and combine 3D elements with 2D images or multimedia. You can also use photographs or video with 3D elements and apply front projection mapping to make the elements accurately cast shadows against the photo or video image.
- Intuitive interface with on-screen tutorial get you up and running fast. Want the easiest way to composite? Need a tip on shadowing? Curious about surfacing options? The on-screen tutorial is an encyclopedia reference, teacher and consultant that not only gets you up and running quickly, but helps you be more productive every time you work.
- Includes a complete library of over 1,600 models, objects and other items for you to use alone or in combination with other graphic elements.

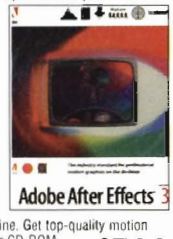
Inspire 3D for Windows **385.00**

Inspire 3D for Macintosh **385.00**

Adobe AFTER EFFECTS 3.1

Compositing, Motion Graphics & Special Effects for Mac or Windows

After Effects 3.1 provides the power and features required by film makers, video producers, editors, graphic designers, multimedia professionals and web developers to produce unlimited composites, fluid animations and sophisticated special effects. Available for Mac and Windows, After Effects is tightly integrated with the Adobe product family, so if you work with Premier, Photoshop, or Illustrator, you already have the skills, shortcut know-how, and hardware to make After Effects a seamless, powerful extension of your creative arsenal. Turn your computer into a motion-graphics studio and put awe-inspiring action into your work.



SOPHISTICATED COMPOSITING:
- Combine digitized materials from any source to create sophisticated composites and traveling mattes using transparency, complex masks and alpha channels. Animate Photoshop layers and Adobe Illustrator art with direct import capabilities.

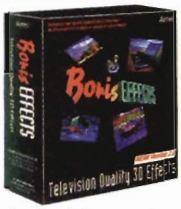
MOTION GRAPHICS:
- Position and animate layers with unlimited keyframes and sub-pixel accuracy. View and edit your spline-based motion paths on-screen. Ensure super smooth motion at any speed with field-rendering and true motion blur.

SPECIAL EFFECTS:
- Use use plug-in effects ranging from precise color correction filters to wipes and blurs, and even Photoshop filters. You can also animate each effect independently over time.

AFFORDABLE QUALITY:
- Create anything you can imagine. Get top-quality motion graphics for film, broadcast or CD-ROM— at a fraction of the cost of a dedicated system. **$599**

Artel Boris Effects 3.5

A multi-channel DVE generator, complete with intraframe interpolation, matte manipulation, and multiple keyframes, Boris Effects lets you to create your own custom moves. Boris ships with a keyframe library of over 150 customizable effects including cubes, picture-in-picture, chroma keying, tilting,soft edges, masks, filters and compositing of unlimited track of video and graphics. Effects can be saved or used with different video source clips. Create 3D flying logo effects from PICT, TIFF, bitmap, VfW and QuickTime files using an embedded alpha channel. Other features include borders and drop shadows which can be colorized and made soft and translucent, as well as control over camera position and light source with specular highlights. Based on a plug-in architecture, Boris closely integrates into all of today's popular non-linear systems. Once installed, it is easily accessed from their transitions and filters menu. It is not a background application and no extra memory is required.



- Blur and bevel filters.
- Control of image scale (size), positioning, depth and opacity.
- 3D effects with depth control to create cubes or slabs with up to 6 different videos, picts or colors on each of the 6 faces.
- Variable pivot points for unique rotation control.
- Add keyframeable specular and ambient light to your effect.
- Cropping with full softness control of the edges and blend for really smooth soft wipe type of effects.
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For Avid Xpress (Macintosh) **749.95**
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QUICK DIAL 731

miro

DC-30 *plus*
PCI Capture Card for Windows 95/NT

The DC30 *plus* lets you capture, edit, add special effects or titles to your video, mix CD-quality audio, and then output the final cut to video tape. The DC-30 *plus* also offers fast plug and play installation and easy to use software so you'll be producing studio quality video in minutes. It even analyzes your system and automatically configures itself to provide the optimum video quality.

- The DC-30 is a PCI Bus mastering card that delivers a 6MB per second sustained video data transfer rate for high quality video capture. PCI Bus mastering ensures CPU bottlenecks don't impede the performance of the PCI bus, thereby limiting the reachable video transfer data rate.
- 2.4:1 compression ratio (adj. up to 32:1). A lower compression ratio means a better final video image quality. Compression ratios under 4:1 are considered to be "broadcast quality."
- Real-time video overlay displays the video in real-time on the computer monitor during capture and video editing process eliminating the need for an external video monitor.
- Full NTSC, PAL, SECAM, PAL M for worldwide compatibility.
- Audio and video capture is synchronized to achieve perfect lip-sync. (Capture from 8-bit mono 11kHz to 16-bit stereo 44.1kHz.
- Hardware acceleration of Adobe Premiere provides almost instant display of video "thumbnails" in the construction window (under one second). Acceleration also reduces the time to create "previews" and final video clip with "make movie".
- Includes Adobe Premiere 4.2 full version, Photoshop LE, Adobe Acrobat Reader and Asymetrix 3D /FX animation software. Also includes TitleDeko software, easily adds amazing titles to all of your video productions. Titles can fade up, scroll and even blend with pictures.

DC-30 *plus* for Windows **749.00**
NEW! DC-50 Same as DC-30 plus with component in/out **1649.00**

Miro DC-30 *plus* Turnkey System:
- 220-watt midtower case • Pentium 233 MHz MMX processor • PCI motherboard with 512K cache
- Diamond Stealth 3D 3000 4MB DRAM PCI display card • 64MB of RAM • Quantum 3.2 GB IDE system drive
- Seagate (Barracuda) 9GB SCSI-2 FAST/Ultra-wide hard drive • Adaptec AHA-2940UW FAST/Wide SCSI-2 controller
- 3.5" floppy drive • Teac CD-532E 32X EIDE internal CD-ROM drive • Altec-Lansing ACS-43 2-piece speaker system
- Focus 2001A keyboard • Microsoft MS mouse • Viewsonic G771 17-inch 1280 X 1024 SVGA monitor
- Windows 95 • Miro DC-30*plus* video/audio capture card • Adobe Premiere 4.2 (full version) editing software, Adobe Photoshop 3.05 LE imaging software and Assymetrix 3-D F/X animation & TitleDeko software **$2995.00**

DV-300
IEEE 1394 Digital Video Capture Card

A digital video capture, editing, and playback solution for Windows 95/NT and MacOS , the DV-300 is built around an intuitive software application that offers frame-accurate DV camera control uncompromised image quality, and the ability to intelligently search digital videotapes for individual scenes. Additionally, the DV300 differentiates itself by providing a built-in SCSI port for connection to high speed drives.

DV-300 Hardware:
- PCI board with bus mastering interface
- Includes 1394 cable
- One internal and two external DV connections
- Bundled with Adobe Premiere 4.2 LE
- Convert your DV data for editing with other miroVIDEO editing adapters (e.g. miroMOTION DC30, DC30 plus.)

DV-300 DVTools Software:

DVTools automatically scans the DV tape and finds scene in and out points. The Camera Controller allows for previewing before down loading any data. Scene locations with timecode are organized in the drag-and-drop Capture Gallery. Scenes can be trimmed so only the video you want is captured, saving you valuable hard drive space.
Once you have arranged the scenes to edit, DVTools will automatically cue the camera and capture them.

Segments can be arranged for a cuts only production, or loaded into Premiere for effects and transitions. miroINSTANT DV, a plug-in for Premiere renders only effects and transitions, saving up to 50% of your hard drive space by not re-rendering the video clips. The video and the effect segments are then stored as individual video files. When production is finished, output to the camera through the IEEE1394 link. From Premiere, miroINSTANT DV automatically prints files back to tape in one pass, overcoming the 2 GB movie size limitation.

PINNACLE SYSTEMS GeniePlus

Post-Production System on a Single PCI Card

Based on Pinnacle's EMMY award-winning special effects technology, GeniePlus is a complete desktop post-production system that includes a 3-D DVE/switcher, advanced character generator, fast still-store and a dynamic paint system – at a price you can afford. Equipped with an incredible array of features on a single PCI card, GeniePlus lets you create your own stunning effects, including page turns, water ripples and spheres with uncompromised 4:2:2 digital quality. The full-function 3-D DVE provides ultra-smooth motion and no breakup (pixelation) when pictures are sized or rotated. You'll be able to create exciting warp effects with lighting, trails, shadows and borders faster and easier than ever before.

Switcher/DVE:
- Two live inputs, two frame buffers for use as still-stores, and built-in matte and black generators. Internal linear keying allows multiple layers to be created in a single pass.
- Over 100 effects and transitions including single-pass page turns, warps, ripples, spheres, trails, shadows and a wide variety of borders. You also have control over lighting and virtually all the controls can be keyframed.
- Full spectrum chroma keying with amazing quality. Quickly choose the exact color you want to key out.
- Add warp shapes including hourglass, hexagon, balloon, diamond, octagon and bumps to the foreground image.
- Need a glint to float across the screen or title? How about a spot light to enhance the scene? Maybe you need to darken all but a certain part of the screen to point out an element? They are all yours with Manual Highlights controls.

Paint:
- Cursor is invisible. As a result, brush strokes look like animations, and may be used to illustrate sports moves, show an itinerary over a map or illustrate weather reports.
- Any Windows font can be used for Paint, and text may be scaled, rotated, etc. Shadows and outlines are easily applied and there are many options for the color of the text.

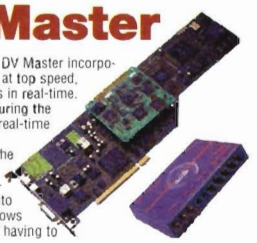
Character Generator:
- GeniePlus comes bundled with Inscriber CG, the standard for character generation. Supports multiple fonts (TrueType or PostScript), a great variety of text styles, geometric objects, backgrounds, and different color combinations.
- Styles include a combination of settings such as emboss, glow, shadow, outline, gradient, and transparency.
- Import regular ASCII text files. Adjust text to the screen with automatic horizontal and vertical centering tools. Lines can be automatically abutted, aligned to the right or left, or placed anywhere on screen. Logos can be imported and placed at will. Backgrounds can be comprised of graphics files, solid colors, gradients or live video.
- Variable speed rolls and crawls.CG pages can be used directly from Inscriber or saved to be used by the DVE..

Other Features:
- Has connections for six video inputs—three composite and three S-Video —two of which may be switched at a time. (Accepts NTSC or PAL signals). S-Video and composite sources can be mixed. There is also an external sync input with loopthrough.

TURNKEY GENIEPLUS COMPUTER SYSTEM
- 220-watt midtower case • Pentium 233 MHz MMX processor • PCI motherboard with 512K cache
- Diamond Stealth 3D 3000 4MB DRAM PCI display card • 64MB of RAM • Quantum 6.4 GB IDE system drive
- 3.5" floppy drive • Teac CD-532E 32X EIDE internal CD-ROM drive • Altec-Lansing ACS-43 2-piece speaker system
- Focus 2001A keyboard • Microsoft MS mouse • Viewsonic G771 17-inch 1280 X 1024 SVGA monitor
- Windows 95 *plus*— card and software installed **$6495.00**

QUICK DIAL 731

FAST DV Master

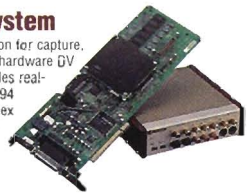


Unlike software-based DV systems that can be as slow as six times real-time, DV Master incorporates Sony's DVBK-1 DV hardware CoDec to guarantee lossless transmission at top speed. With just one cable you can transfer video, sound and machine control signals in real-time. Also allows the display of live video during "capture", as well as at any time during the editing process. You can scrub in or trim the timeline, and then preview it in real-time at full-screen, full-motion on your video or computer monitor.
Another advantage of having the Sony DVBK-1 on the board, is that it allows the DV Master to act as a real-time video transcoder. Using the supplied breakout box, you can simultaneously convert analog composite, S-Video and component into digital and vice versa. This is ideal for archiving analog footage onto digital as well as for mixing analog and digital footage when editing. It also allows you to transfer edited digital footage directly to S-VHS or Betacam SP without having to first go back to the camera.

DV Master w/Ulead Studio Pro 5.0 ..... **1899.00**
DV Master w/InSync Speed Razor DV Software **2799.00**

canopus **DVRex-M1**

The Complete DV Digital Video Editing System



The DVRex-M1 is a hardware and software bundle that offers a complete solution for capture, output and editing of DV (Digital Video) signals. Equipped with Sony's DVBK-1 hardware DV codec, a breakout box and ULead's Media Studio Pro 5.0, the DVRex-M1 provides real-time capture and output of DV signals from your camera or VCR via the IEEE1394 port, or converts any analog video and audio to DV. The system also includes Rex Edit software so you can control your DV camera or deck, batch capture video and audio, add new audio tracks and scrub in real-time. DV editing has never been so fast, easy and flexible!

Hardware Features:
- High quality, scalable video windows displays real-time, full-screen video during capture, editing and output.
- During analog capture and output, video characteristics like brightness, contrast, saturation etc. can be manually set.
- When incorporating effects, an optimized hardwared DV codec cuts rendering time up to 25%.
- Unique DV breakout box can be used either externally or internal in a 5-1/4" drive bay. The box features composite and S-Video input/output, DV input/output and analog stereo input/output. With the optional M2 module it can also output component video signals and input/output digital audio signals (RCA and optical).

Rex Edit Software Features

Manual and Batch Capture:
- Capture up to 20 minutes (4GB) into one AVI file
- Seamlessly capture long DV segments in one pass (over 20 minutes)
- Capture audio from single of multiple DV channels if desired
- Frame accurate camera control when defining a batch list of video clips
- When batch capturing, camera automatically seeks to clips
- Batch clips can be stored in one or multiple AVI files

Editing:
- Easy to use drag-and-drop interface with audio and video timeline. Manually scrub through the timeline using a Microsoft IntelliMouse
- Real-time video insert and audio scrubbing
- Video can be output directly from the timeline with seamless playback
- Works together with ULead's MediaStudio Pro 5.0 (bundled with DVRex-M1) for effects and titling

Multi-Channel Audio Input and Output with Mixing:
- Capture and output native DV multi-channel audio
- Audio is perfectly synced with video during production and output
- Overcomes AVI single channel limitations with real-time audio mixing
- Multi-channel audio requires no rendering for real-time adjustment and output

Available with or without Ulead software

TRUEVISION/Avid

TARGA 1000/MCXpress
Professional Video Production Workstation

Incorporating the award-winning TARGA 1000 video card and Avid MCXpress NT non-linear editing software, this fully-configured workstation meets the needs of production professionals, corporate communicators, educators and Internet authors.

TARGA 1000 Features:

The TARGA 1000 delivers high processing speed for video and audio effects, titling and compositing. Capture, edit and playback full-motion, full-resolution 60 fields per second digital video with fully synchronized CD-quality audio.
- Compression can be adjusted on the fly to optimize for image quality and/or minimum storage space. Has composite and S-video inputs/outputs. Also available with component input/output (TARGA 1000 PRO).
- Genlock using separate sync input for working in professional video suites
- Audio is digitized at 44.1KHz or 48KHz sampling rates, for professional quality stereo sound. Delivers perfectly synchronized audio and video.

MCXpress Features:

The ideal tool for video and multimedia producers who require predictable project throughput and high-quality results when creating video and digital media for training, promotional/marketing material, local television and cable commercials, CD-ROM and Internet/intranet distribution. Based on Avid's industry-leading technology, it combines a robust editing functionality with a streamlined interface. Offers integration with third-party Windows applications, professional editing features, powerful media management, title tool and a plug-in effects architecture. It also features multiple output options including so you save time and money by reusing media assets across a range of video and multimedia projects.

TARGA 1000/MCXpress Turnkey Systems:

- 300-watt, 6-Bay Full Tower ATX Chassis
- Pentium ATX Motherboard with 512K Cache
- Pentium II- 300 MHz Processor
- Matrox Millenium II AGP 4MB WRAM Display Card
- 64MB 10ns 168-Pin (DIMM) S-DRAM
- Quantum Fireball 6.4GB IDE System Drive
- Seagate Barracuda External 9.1GB SCSI-3 Ultra Wide Capture Drive
- Adaptec AHA-2940UW Ultra Wide SCSI-3 Controller Card
- Teac CD-532e 32X EIDE Internal CD-ROM Drive • 3.5" Floppy Drive
- Altec-Lansing ACS-48 3-Piece Deluxe Speaker System
- Viewsonic G771 17-inch (1280 x 1024) Monitor (0.27mm dot pitch)
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- Windows NT 4.0 Operating System Software
- Avid MCXpress for Windows NT
- Truevision TARGA 1000 or 1000 Pro Video Capture Card

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BY MOJO

Time To Play

Is It Really Only A Movie?

A short while ago, a very special event took place—a moment I had been anticipating for 15 years. That moment was the day the trailer for *Star Wars: Episode One* premiered, thrusting the new *Star Wars* movie out from the obscure shadow of myth into the tangible light of reality.

OK, so maybe I'm going a little overboard by making a new movie sound like the Second Coming but let's face it—this is a big deal. *Star Wars* is more than a movie—it energized a generation and serves for many as an icon of hopes, dreams and professional aspirations.

So imagine my surprise when not a single one of my comrades at Foundation Imaging wanted to join me that *night* to go see it! OK, so it wasn't a convenient plan—drive to Hollywood, wait in line for at least an hour and pay eight bucks just to see 90 seconds of film—but this was *Star Wars*, for crying out loud! Still, no one took me up on it. They were willing to wait a few more days when the trailer would be in wide release.

So I called the theater that morning and reserved a single ticket for a movie I wasn't even going to stay and watch. A few hours later, my unsympathetic coworkers discovered that the trailer had been posted to the Internet. I watched in horror as they gathered around a monitor to watch a ragged, postage-stamp sized AVI. I couldn't believe it! Had they all succumbed to the dark side? Before it started, I quickly retreated to my office and closed the door. I heard them laugh at how silly I was acting.

I didn't get it. How I could be the only one in a company full of science fiction fans to want to see this trailer the *right* way? I began to feel like Roy Neary in *Close Encounters of the Third Kind*, who begins to doubt his own sanity as he is driven by unseen forces to meet a destiny no one else can understand.

As I drove to Hollywood that evening, I seriously wondered if I was being a child about this. Was everyone else right? Was it just plain dumb to drive all this way, pay all that money and wait in line for a stupid trailer? Would I be the only one standing in front of the theater, cursing myself and wishing I had been sane like the rest of the world?

As I briskly walked toward the theater, my answer was in plain sight; *hundreds* of my brothers and sisters were already standing before me, forming a queue that stretched down the block. I took my place and asked if anyone else had watched the trailer on the Internet. "Hell no!" They all wanted to wait and see it the way it was meant to be seen—on the big screen, in a theater packed with fellow idealists who would never feel the sting of practicality.

I breathed a sigh of relief. OK, so I wasn't crazy. But still I wondered: what *is* the reason that all these people were drawn to the same light? What made us feel the urge when so many others hadn't?

When you're a kid, life is about going out to play. That's all you want to do; it's all you know and all you care about. As we get older and take on the responsibility of adults, we have less and less time to play. We have to get jobs and pay bills and get the car fixed, and even raise families. Slowly, but surely, the playtime gets replaced with obligations and, if you're not careful, a day may come when the child completely vanishes. It's so easy to get caught up in the complexity of our lives that it simply may not seem important anymore to go out and play.

Star Wars was what defined me as a kid. It was the most important event of my childhood. It was my first love and all my playtime revolved around it. Eventually, *Star Wars* motivated me to pursue a career in Hollywood and is what guided me to where I am today.

Whenever I see a *Star Wars* movie or hear the music or play with a toy I can't help but feel like I'm 10 years old again and the world is my playground. Perhaps, in my own complicated world as an adult, *Star Wars* is the last bastion of my childhood and is something I want—or need—to keep sacred. I cannot let myself become practical or responsible in my love for it because that's just not the way kids act!

For some people, going out to play means driving their sports cars or drinking all night or going to Disneyland...but not for me. For Mojo, going out to play meant driving out of my way to wait in line for an hour and pay eight bucks to see 90 seconds of film.

Does that make me dumb? No way. It keeps me young.

Mojo is a supervising animator at Foundation Imaging.

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